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June 1989

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Radio Control **CAR ACTION**

THE WORLD'S PREMIER R/C CAR MAGAZINE

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**RC10
Tranny Tech**

**ELIMINATE
R/C RADIO
GLITCHES**

**BAD-
ASS
LUNCHBOX
RETURNS!**

**MICKEY THOMPSON
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INTENSE!

ON THE COVER: Center: Royal Crusher (photo by Rick Houle). Upper right: Josh McNattin with the JG Ultima Truck Conversion (photo by Dave McNattin). Lower right: Judges at the Mickey Thompson Grand Prix (photo by Rick Houle). Top left: AYK Pro Radiant (photo by Mike Lee). Top right: Tamiya Lunch Box (photo by Steve "Smitty" Pond).

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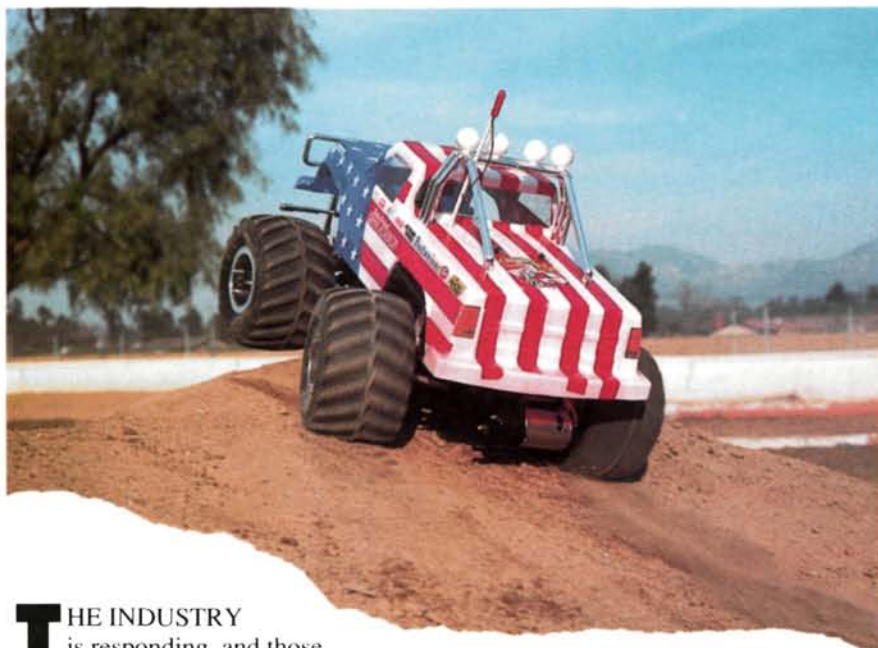
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EDITORIAL

by CHRIS
CHIANELLI



THE INDUSTRY is responding, and those who have long-term insight are probably the ones who will be around for the long run. I'm speaking of events like the Trinity/Car Action Sportsman Cup Race where Speedworks motors are handed out and no factory team drivers will be permitted. Now Dan Perkins of Global Hobby and Dan Moynihan of Dan's RC Stuff have taken the next step. With *Car Action*, they co-sponsor an on-road event modeled after the famous IROC full-scale series. Basically, all the cars in the IROC series are prepared and controlled by the association. These Californian guys supplied identically set-up Panda Stockers with Twister Stock motors matched by Mike Walker of Twister (thank you, Mike). The unique thing about this race is that the off-the-shelf Panda Stocker fills a gap between the on-road cars, like the BoLINK Eliminator, and the off-roader. Unlike the on-road cars, the Panda stocker can run on less-than-smooth parking-lot surfaces and is much simpler, and less expensive, than the competitive off-roader. Now, any closed-off street, community basketball court, shopping-mall parking lot, or school gymnasium is a potential site for events—events that should be embraced and sanctioned with fervor by the industry. We're talking mainstream here! Let's keep the ball rolling.

I welcome aboard four new writers: Danny Batinitch, who will be following the Panda series; Donald Amberger, who starts his contributions with a two-part article that will help us to identify and understand those annoying radio glitches; Bob Gagne, who shows us how to make custom number decals; and Mike Winter, who gives us RC10 tranny tips. Also, I apologize to John Rist—our electronic wizard from Alabama—for neglecting to welcome him last month.

No message from the Ayatollah this month; he was last seen locked in afterburner headed for the Waste Land with Sergeant Major Danger. ■

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LETTERS

WHERE TO WRITE TO US

If you're writing to the editors (and we'd love to hear from you), please be sure to address your letters to "Letters," *Radio Control Car Action*, 251 Danbury Road, Wilton, CT 06897. Only subscription orders and inquiries are handled by our Customer Service Department in Mount Morris, IL; other mail addressed there must be forwarded to Connecticut, which leads to long delays.

Aero Information

As you've probably seen, nearly all R/C car have spoilers, and almost every company is trying to produce aerodynamic bodies to "reduce airflow." I asked a physics professor at UCLA and, taking into consideration the average weight and size of most R/C cars, he agreed with me that spoilers have no effect on downforce, and aerodynamic bodies have little effect on speed and/or handling. Do you agree with this, and why?

JOHN WESTLETON
Santa Monica, CA

John, I totally disagree with both the UCLA physics professor and you. If you had limited your theory to backyard off-road buggies running through chassis-high grass, I would tend to agree that aerodynamics isn't important. However, you made a statement about R/C cars in general. Aerodynamics does affect R/C cars greatly on the racetrack. The faster the cars go, the greater the effect. You must remember that because the cars we race are so lightweight, it doesn't take a great deal of downforce or lift to have a major effect. I have seen cars handle totally differently by adding a wing - or changing the body style. The last time I had the opportunity to race at Lake Whip-poorwill International Speedway, I

crashed during a race and ripped my rear wing off. After that, my car had so much oversteer I couldn't drive it anymore, so I parked it in the infield. In this issue, you can see where Dick Brinton uses a wing to correct a handling problem in "Budget Racer." Go out and try some experiments for yourself. Maybe you can invite the professor to join you for a little aerodynamic trackside testing session.

RH

Brute Mileage

How are you doing up there in monthly *Radio Control Car Action* land? I love reading this magazine. I'm addicted to reading it over and over. I always read all the articles, but my favorite part is the

THE OVAL EDGE



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"Letters" section. I'm not sure why, but it's like the monthly gossip column. I don't mean this in a bad way; I think some of the letters are kind of funny, like the ones about Mrs. Rodgers.

So I was thumbing through the November issue (amazing, huh? A reader devoted enough to still have the November issue), and I read the article about the Kyosho Nitro Brute. I was amazed.

I'd just like to know how much gas the tank uses up in one run (to see how many runs I could get for a \$30 gallon of gas). Would I have to keep making adjustments to the engine or carburetor, or whatever needs adjusting? And last, what would I do about the rear shocks, which are too soft?

I trust you, and I'll take your word. Thanks for the awesome output on the fast-changing radio-control car industry.

EDWARD ALOMAR
Greenville, SC

Ed, you didn't state the nitro content, but \$30 a gallon sounds steep unless you're using 40-percent nitro. Shop around for a better price. The Nitro Brute has only a 3- or 4-ounce tank, so a gallon would give you many months of running. I suggest that you buy your fuel in smaller quantities, because the nitro tends to dissipate over time, so making the fuel less potent. The engine in the Nitro Brute does need adjusting, especially during break-in. If you keep the engine clean and oiled during storage, and use an air and fuel filter,

the O.S. engine should give you little trouble. Make sure you always have a fresh starter battery and glow plug. The soft-shock problem is easily fixed with a good set of after-market oil-filled shocks that come with an assortment of springs.

CC

Dead Diff

I'm 15 years old and became interested in R/C cars about three years ago. I've never had such a puzzling problem as this. I have an MRC Frog and I've been replacing long/short, joint shafts, and half-shafts for it every six hours of running time. I've replaced this setup six times. Could you

(Continued on page 10)



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LETTERS

(Continued from page 9)

help me with this problem? Thank you.

JASON STINSON

Madiera Beach, FL

Jason, the Frog and the Blackfoot have had this problem from the beginning, and the metallurgy in this area seems to have gotten worse. If you want the most permanent fix, the MIP diff, dogbone, axle and output cup setup is the way to go.

CC

Which Car Is It?

I'm just getting started in R/C cars. In Fred Murphy's "Troubleshooting" article in your January '89 issue, a small piece of a manual is pictured, but it doesn't tell the name of the car. I'd like to know which car it is.

W.P. ADAMS

Huntington, WV

Dear W.P., the manual referred to is that of the Kyosho Ultima.

FM

Clod Query

I just received your latest issue of *Car Action*. It's awesome. I already have a Fox and am interested in buying the Clod Buster. You said that the 4000mAh battery pack lasted three times longer. What does it take to recharge this battery pack? What is the Clod Buster's top speed, stock? What do you mean you adjusted the Clod Buster to take on the snow? What could I do to make the Clod Buster faster?

BOBBY HAHN

Peekskill, NY

Bobby, it takes about 45 minutes at 4.5 amps to recharge a 4000mAh battery; the top speed of the Clod Buster in stock configuration with a 6-cell 1200mAh pack is approximately 10mph; "adjusted" to the snow simply means getting used to driving in it; and see "Project Clod Buster" in the April '89 issue. How's that? SP

Stock 2WD Shootout

I'd like to start by telling you that your magazine is the best money can buy. I start looking forward to the next issue, the

day after I buy the current one.

I can't find the answer to the age-old question: "Which is the best 'box-stock' car, the RC10 or the Ultima?"

Like most people in this sport/hobby, I really don't care about graphite chassis plates, hot winds, or the very latest in MOSFET technology, because I can't afford this stuff. All we really want to know is, what car can cross the finish line first, out of the box!

RAY FOSTER

Hamilton, Ontario, Canada

Ray, the car that crosses the finish line first is dependent on who's at the wheel. However, your point is well-taken and we're planning a box-stock shootout between three (and possibly four) 2WD top contenders.

CC

Gimme A Break

I'm a frequent reader of your magazine. In an article entitled "The First Annual Dirt Shootout" (Jan. '89, pg. 44), you show a JR-X2 and you say it's "racing in box-stock form." I'm pleased with the performance of my car, which happens to be a JR-X2. The shocks on the JR-X2 in your photo are Associated RC10 shocks, so the car isn't racing in box-stock form. I just thought I'd point that out. Also, do you know of any good Competition 2WD off-road cars other than the JR-X2 and the RC10?

JIM HAMMER

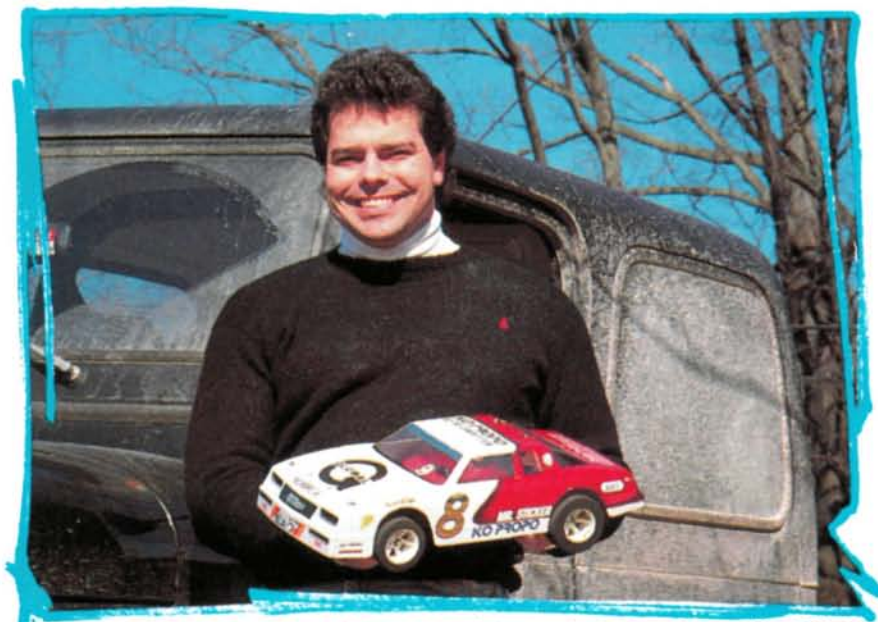
Hamilton, Ontario, Canada

Jim, during the First Annual Dirt Shootout, the JR-X2 cars were raced in stock condition. Stop being such a stickler for details. Yes, the cars pictured were using RC10 shocks, which wouldn't make them "stock" in the purest sense. But, at that time, the Losi camp hadn't finished the final production of their shocks, so they used other shocks in the interim. Another car that falls into the performance category of the RC10 and the JR-X2 would be

(Continued on page 14)

PUBLISHER'S PAGE

by LOUIS V. DeFRANCESCO JR.



Publisher Louis DeFrancesco is holding one of the Panda Stockers donated by Global Hobbies that were raced at the R.G. Canning exotic car shows. Car Action sponsored the R/C racing at these shows.

AS WELL AS promoting R/C within the industry using obvious avenues like trade and consumer shows, we are, with more regularity, doing promotions outside the obvious mediums. Last February and March, we sponsored R/C car demonstrations at some of the largest California exotic car shows run by R.G. Canning in Del Mar and San Bernardino, respectively.

We gave away thousands of free magazines, and the great people at NORRCA set up the race tracks and orchestrated the race action. Throngs of spectators were there to check out the action—sometimes six deep—the response was overwhelming, and there were R/C Panda stock cars provided by Paul Bender of Global Hobbies for spectators to use! What an effective way to excite a newcomer!

Collectively, the R/C industry should be cognizant of the importance of this outside promotion; it's the only way to direct newcomers into the R/C hobby, and much more is needed. Remember, it's these newcomers who will be the future of the hobby. We have a lot more planned with upcoming full-scale car shows, and I'm personally open to more suggestions and ideas from other industry members. We at Air Age Publishing would like to personally thank Danny Batinich and the members of NORRCA who donated their time and energies to help make these California shows a success. It's people like these who have contributed to the growth of the hobby and have made it fun for all involved.

***Just in:** Car Action is cooking up a major East versus West High-Banked Shoot-out this fall. This series promises to be the major R/C racing event of the decade. The Thunderdrome will host the West Coast action, and Lake Whippoorwill International Speedway will be the East Coast racing site. Watch for all the details next month. You won't want to miss this one!*

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LETTERS

(Continued from page 10)

the Turbo Ultima or the new Ultima Pro.
SP

Belt Me

Your magazine is the only R/C magazine worth buying. Your December '88 mag is my favorite. The articles "4WD Shoot-out" and "Optima Mid SE" made me decide to purchase a Turbo Optima SE.

I was thumbing through your January '89 issue, and I noticed that on the cover it said, "Optima Belt Conversion." I looked through the whole magazine, and I couldn't find it anywhere. Was it a typing error, or what? I wanted you to know how much I like your mag and that I couldn't find the information advertised on the cover.

JEREMY H. BURDEN
Brunswick, ME

Jeremy, there was, in fact, an Optima belt conversion in that issue, but we should have made it easier to identify in the table of contents. The article you're referring to appears as "Project Javelin" on page 34 of the January issue. As part of the article, I performed a belt conversion with very desirable results. The chassis are identical on both of these cars, which makes the conversion possible for either car. However, if you own a Turbo SE, it already comes with a belt. Sorry for the confusion.
SP

Eagle Eye

I think I found the Eagle Eye for the April '89 issue on page 23. Above the Kyosho Double Dare specs, it says "Big Grizzly specs." Keep up the excellent job!

KEVIN HALIFAX
Grasonville, MD

Congratulations Kevin, your Car Action decals are on the way.
CC

Shrunkn Foot

Just got my April Car Action, and I wanted you to know that I think it's the best yet. I'm into monster trucks myself, and can't wait to see the rest of your

"Clash of the Titans."

I now have a Blackfoot and love every inch of it, which brings me to the reason I'm writing: On page 104, you state your Blackfoot is only 7³/₄ inches long and 11 inches wide. Is this the mistake I've been dreaming of?

JERRY GARMS
Baton Rouge, LA

Jerry, you got us. Yes, that was a mistake: The Blackfoot is 17³/₄ inches, not 7³/₄. For some trick modifications on your Blackfoot, check out the "Project Blackfoot" article in our May '89 issue (if you haven't already seen it). As far as the final part of "Clash of the Titans," we're experiencing operating difficulties, please stand by.
SP

A Satisfied Customer

After reading all the negative letters about cars, ROAR, etc., I'm writing about a good experience. Shortly after purchasing a JR-X2, the rear wheels cracked and eventually broke. I sent them in to Team Losi, asking for a new pair. In no time at all, the wheels came back. The wheels were a new, better design, and most important, there was no cost to me. This got me back to racing happily.

SCOTT KEIPER
Evergreen, CO

Scott, it's always good to hear about manufacturers who believe in customer service. What better way to build customer loyalty. Way to go, Team Losi!
RH

We welcome your comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, due to the tremendous number of letters we receive, we cannot respond to every one.



CAR ACTION'S CALIFORNIA OVAL

IDON'T KNOW how many of you have tried to race your cars on parking lots, but I'm sure many R/C racing pioneers have struggled to keep their 1/10- and 1/12-scale cars on the uneven, bumpy pavement that's typical of most parking lots. It's a real challenge to drive an R/C car

when the wheels spend half their time *above* the track.

At the 35th Annual San Diego Exotic Car Show, presented by R.G. Canning

the next, they'd stop to watch the racing. All day, on both Saturday and Sunday, people stood around the track five and six deep. *Car Action* gave 10,000 free copies

Attractions on the fairgrounds in Del Mar, CA, NORRCA teamed up with *Radio Control Car Action* (the major sponsors) for R/C racing. The car show was held in two buildings, and an oval track was laid out on the asphalt parking lot between them. As the car-show crowd went from one building full of exotic cars and trucks to

R/C RACING DRAWS A BIG CROWD AT FULL-SCALE CAR SHOW



*Above: Flat-track oval racing on a rough parking lot at high speeds was enough to keep the corner marshalls plenty busy and the crowd interested.
Far Left (inset): The pace car for this event was this impeccably finished Panda Stocker painted by Mike Ogle.*

of recent issues to spectators, and there were many questions from interested onlookers.

The race was the fifth of a six-race series for NASCAR-style cars, and there were seven classes scheduled: Direct-Drive Open and Stock, Gearcase Open and Stock, $1/12$ -Scale Open and Stock, and Novice. Because of the track's roughness, most of the $1/12$ -Scale drivers elected not to run, but five of the $1/12$ -Scale Stock competitors stuck it out and put on quite a show for the fans. The $1/12$ -Scale Open Class was scratched, and there was only one Novice entrant, which shows that we R/C enthusiasts need to make the public more aware of our sport and hobby.

Fun is the bottom line and fun was had by all. The Direct-Drive cars spent a lot of their time airborne, and the drivers had to really *drive* this track. The cars sped down the 91-foot straights and had to brake for the 40-foot U-turns at each end. Because of their sus-

pension systems, the Gearcase cars had it much easier, and they handled much better than the Direct-Drive cars. Despite track conditions, the entrants I talked to told me that they'd had a great time.

Exotic car shows are for beautiful machines, and Concours was held to find "the most beautiful in show." R.G. Canning Attractions provided the 1st-through 3rd-place trophies that were the same size and design as those for the real show's winners. The judges were: Dan Moynihan, owner of Dan's R/C Stuff; Dan Perkins, sales manager of Global Hobby Distributors; and Tony Morejon, show chairman of the Long Beach Exotic Car Show—another of R.G. Canning's attractions. They were unanimous in their selections, but the choice was tough. The "Best of Show" went to Ted McDonald, who is sponsored by B&R Motor Works and Fast Lane. The Bill Elliot Coors Ford Replica was painted by Biff and sat over a Vicfor chassis.

The weekend's strongest driver was Gary McAllister of McAllister Racing. From his first attempt, Gary set top-qualifier in the Direct-Drive Open Class with his Trinity-powered McAllister Outlaw. No matter what the competition tried to do, the McAllister/McAllister combo came back round after round to recapture TQ honors from its short-lived holder. Technically, Gary McAllister is the track record-holder at the Del Mar Fairgrounds Car Show Race with 53 laps in 5 minutes. His 216.8mph (scale miles) was 4mph faster than the speed of his closest com-



When the smoke finally cleared, Gary McAllister was the victor in the OWEER exhibition race. Toting his winning Panda Stocker, here he is receiving his trophy.

R/C IROC

EQUAL CARS TEST DRIVERS' SKILLS

SUNDAY'S HALF-TIME highlight was the POWER exhibition race. The top qualifiers from each class and two guest drivers raced with eight identically prepared Panda Stocker¹/10-scale racers. Built by Milt Lewis, a contract builder, and painted by Michael R. Ogle of Costa Mesa, CA, the cars were powered by Twister 2WD stock motors, which had each been tested by Twister's Mike Walker to ensure that they were as alike as possible. Each car had brand-new foam tires provided by TRC, of Albemarle, NC, and the cars used foam, pre-mounted, trued tires and rims with a blue/orange compound up front and a green/yellow in the rear. The Pandas got their juice from Saft 6-cell battery packs, and each was controlled by KO Propo EX-7 controllers.

The drivers took four laps to get used to the cars, and all agreed that the cars were well-matched. As we prepared for the start of the race, Paul Thompson, service manager of the Panda Service Center in Fountain Valley, CA, brought out the Panda pace car. This beautiful work of art was expertly painted by Michael Ogle, and it sported polished-aluminum rims and an "overall car-show winner's" appearance.

As the field lined up in front of the anxious drivers, I cringed a little. When the command to "roll the field" was given, the drivers responded with their normal "pedal-to-the-metal" squeeze on the triggers and the cars mobbed the pace car. It wasn't easy to stop those guys! The pace car survived with minor scrapes, and the cars were lined up (minus the pace car!) for the start. The green flag was dropped, and eight equally prepared Pandas headed for the first turn. Just when it looked as though they'd take turn 1 four abreast, the you-know-what hit the fan. Out of the pile of Pandas came Gary McAllister driving car No. 2, and he led the race from wire to wire.

The drivers had a great deal of fun, and the fans were cheering for the racers and making the usual "ohs" and "ahs" as the cars bumped, spun, and flipped their way around the track. All the cars



Above: Panda Stockers were outfitted with TRC foam tires for maximum traction on asphalt. Left: Eight identical Chevy-bodied Stockers were provided by Global Hobby Distributors.



finished the 5-minute race with no major damage as the crowd let out a yell of satisfaction and excitement. There were trophies and prizes for all the racers, and these were presented by Priscilla Garcia, of Hobby Shack. Along with the trophies and plaques, each driver received KO Propo and Panda T-shirts, and there were NORRCA TQ pins for the top qualifiers.

The POWER promotion was the brainchild of Dan Perkins, sales manager of Global Hobby Distributors, which also provided the Panda Stockers, KO Propo controllers and Saft battery packs. I spoke with Dan after the award ceremony, and he was quite pleased with the durability and overall performance of the stockers. The racers enjoyed driving the cars, too. At last! A great way to match drivers' abilities against those of their peers. Hats off to the Panda Stocker, the drivers and all the sponsors and other people connected with this great promo.

petitor. Wayne Breault, driving an Agita-tor from Advanced Racing Technologies that was powered by a Losi 19-wind motor, was second-fastest with 53 laps in 5:05.37 minutes, and Herb Hanss was 3rd with 53 laps in 5:05.92.

The Top Qualifiers

Gary McAllister: Direct-Drive Open, McAllister Outlaw, Trinity motor, 53 laps/5 minutes.

Ernie Prince: Gearcase Open, RC10, Race Prep motor, 49 laps/5:05.37 minutes.

Matt Hirsch: Direct-Drive Stock, Bo-LINK Eliminator 10 with Tom Bowlin Front End, Trinity stock motor, 51 laps/5:01.92 minutes.

Wally Ribbs: 1/12-Scale Stock, Delta P-12 Spyder, Race Prep stock motor, 58 laps/5:59.38 minutes.

Bob Baxter: Gearcase Stock, Kyosho Ul-

tima, B&R stock motor, 46 laps/5:00.94 minutes.

A special thanks to all the trophy and product sponsors. Without the backing of the R/C industry, races like this couldn't take place. The fans and racers appreciate you.

Dan Moynihan of Dan's R/C Stuff provided the "Sportsmanship" trophies.

(Continued on page 122)

BUDGET RACER



The Kyosho Raider flying an Associated RC10 wing for oval-track racing.

by DICK BRINTON

WHENEVER I THINK about dirt-oval racing, names like Kinser, Wolfgang, Swindell and Davis come to mind. These guys, and others like them, herd 1,250-pound, 600hp, big-winged sprinters around oval tracks at speeds that are outrageous. Sammy Swindell holds the track record at over 104mph on the 1/2-mile dirt oval in Memphis, TN. That, folks, is haulin'!

Now, most of us will never have a chance to actually drive a full-size, high-tech, outlaw sprint car, but if the thought of dirt-oval racing raises your pulse, we have the next-best thing to being in a race—and the crashes *don't* hurt!

I like oval racing, so I was very interested in having the Raider on the round-and-round track. If you've read the other articles in this series, you'll know that Kyosho's* Raider is a fine entry-level race car. With a little work, it's competitive in the off-road Production Class, and it can show its rear tires to a lot of sophisticated iron.

It has parallel-arm suspension front and rear with a lot of movement available, a mid-mounted motor, and it weighs in at 3.25 pounds, stock, right out of the box, which is right on the class minimum. But, I didn't know how it would work as a

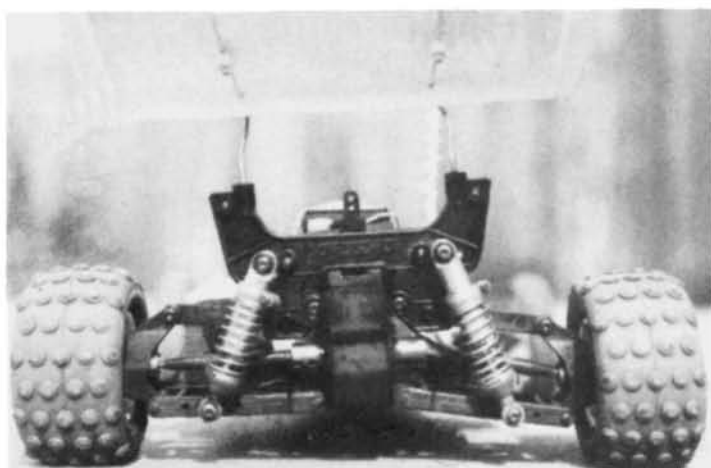
circle burner.

Cars running on ovals are set up differently than the same cars running off-road, and performing well in the rough stuff is no proof that it will work well on smooth oval tracks. Also, a good oval car might not be very adaptable to off-road.

Let's look at some of the requirements of an oval-track car. Since we race counterclockwise in this country, the car has to turn left very well. Apart from when it's running down the straights (and sometimes even then), the car will try to smack into the outer wall. Radio-control cars power-slide through the turns just like sprinters. The rear tires push

RAIDER GO-ROUND

the car down toward the inside rail, or berm, while the front tires steer to the right so that the car tracks smoothly around the turn. Consequently, the front-to-rear trac-



Right rear spring pre-load creates a favorable bias; lower shock mounts are moved out one hole from their stock positions. Note the mounting set-up for the wing.

tion balance must be correct. It's a tricky balancing job, but when your car balances well, you'll really be able to turn some hot laps.

The tires used in oval are sometimes very different from those used for off-road. Oval races are usually run on a smooth, hard, fairly clean track. Even so, tracks change from heat to heat, and having the correct tires to provide the best traction is a basic requirement for winning.

At Sacramento Mini Wheels, the banked oval is 113x57 feet of hard-packed clay that's swept between each set of heats and before the Mains. Held by Mark Zimmerman with a Dominator, the track record is 33 laps in 4 minutes—a 7.27-second lap average! On a 264-foot track (a scale 1/2 mile), that's an average speed of 24.75mph—not bad for a 1/10-scale electric race car on dirt.

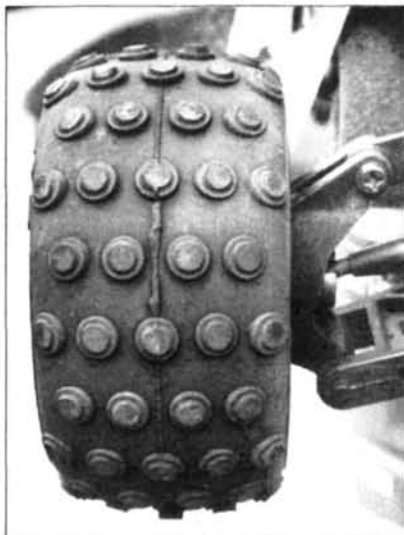
Successful oval cars have good top speeds, and when your oval car handles well, you might be able to run the whole track with the throttle wide open, or with just a momentary "throttle off" to set up your power slide for the turn. Believe me, top end counts, and the right motor and correct gearing are basic requirements.

As well as traction, top end and balance, there's a whole bunch of other handling factors that go into getting your car set up right. Let's take a look at how they were applied to the Raider and see if it can be a competitive dirt-oval machine.

To begin, we have to find out what needs to be corrected. The easiest, and *only*, way to check this is by running the car on the oval on which you'll race, so I

took the Raider, still set up for off-road, to Sacramento Mini-Wheels. Right away, a couple of major problems appeared.

Set up for off-road, the Raider was out of balance. The front tires stuck like crazy, while the rears skated all over the hard track. The car was almost undriveable (at least by me). In addition, the top end was about 70 percent of what I needed. I'd been running a 15-tooth pinion for off-road and that worked pretty well there, but it was woefully short on the big oval.



Here's how the tread was clipped on the rear tires to get rid of the tip of the spikes.

Before attempting to get the top speed up, I had to have the balance corrected, and this meant improving the lack of traction at the rear.

If you want to improve traction, tires

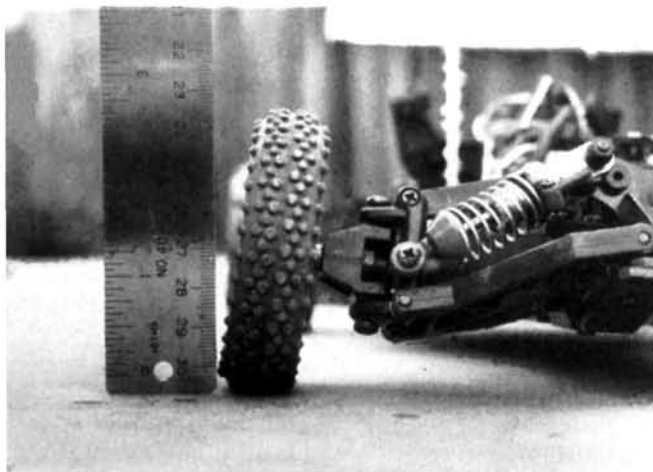
are the first things to consider. However, before making a tire change, I decided to try something less expensive: namely, modifying the stock Raider tires to see if they could work better.

I took a set of diagonal-cutting pliers and snipped off the points of the spikes, leaving only the base lugs. This change made a big difference to the bite, but the car was still very prone to spin-outs. It was time to make some basic changes in the suspension setup. I found that the Raider responded well to weight-jacking or wedge adjustment. The Kyosho Mini Gold shocks were still on the car, and the collar on the right front shock was moved down 7/16 inch (1.1cm) to pre-load the right front spring, transfer some weight to the left rear and increase traction at that point. As the car starts to lean going into a turn, the right front wheel takes the biggest load when the weight transfers. This change also increased the negative camber on this tire, but that worked in our favor.

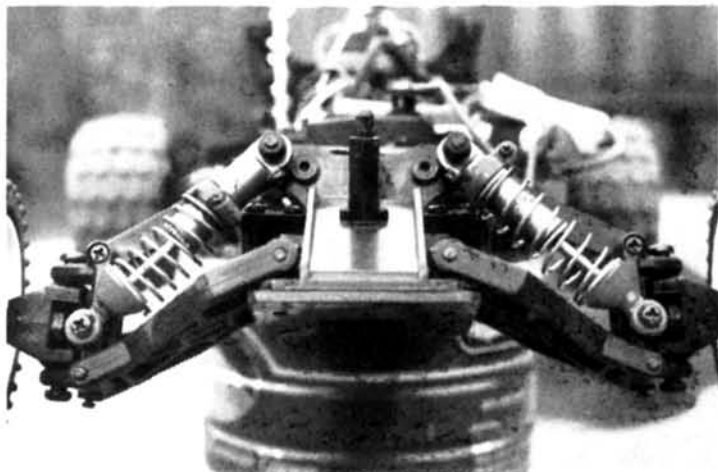
The right rear shock collar was moved down 3/8 inch (0.9cm) to pre-load this corner of the car, and, of course, transfer some weight to the left front, which is generally the tire with the lightest load when running on an oval track.

Weight-jacking works across the car on a diagonal: right rear to left front and right front to left rear. Incidentally, it's possible to jack the weight too much and lose more traction on the end being jacked than you gain on the diagonal end, so make your changes in small increments.

By moving the collars down on the
(Continued on page 82)



The right front wheel shows the dramatic camber change that resulted from the difference in pre-load between the right and left sides of the Raider.



Just as with the rear, the right front suspension is pre-loaded for left turns only.

INSIDE SCOOP

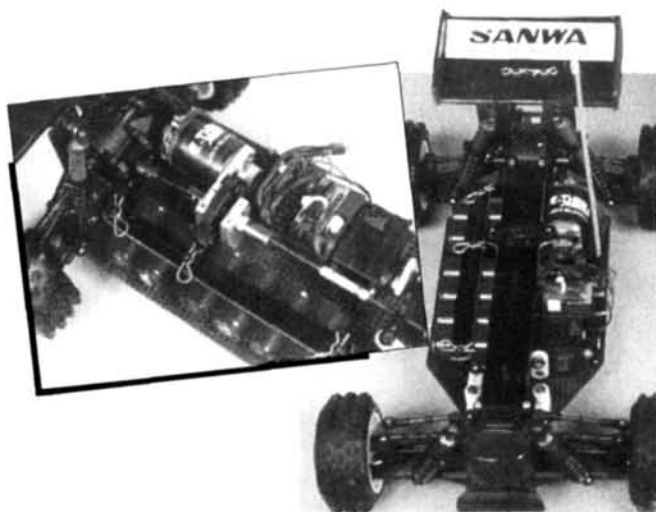
by CHRIS CHIANELLI

The R/C CAR industry is rapidly advancing, with new products being offered at a head-spinning rate. So, I'll make manufacturers nervous, but feed you R/C squirrels who are hungry for info, by bringing you a special report on security leaks and "late-in" items. Here goes!



R/C WET BIKE

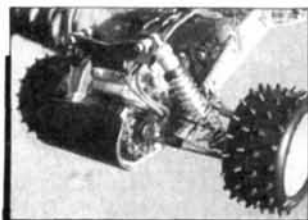
Robbe Model Sports of Belle Mead, NJ, has introduced this 23-inch-long, twin-propeller, 540 Mabuchi-powered R/C Wet Bike. It requires a 2-channel radio and a 7.2V battery; sound familiar? For quick assembly, this thing is made of molded ABS plastic parts, and it's perfect for the beach when it's too hot to off-road.



RS200 ELECTRIC?

However admirable the intentions behind it, here's another Oriental effort of dubious merit. This is a combination of homemade chassis and RS200 drive train and

suspension. The glow engine has been replaced with an electric motor. A truly valiant attempt—at what, I'm sure I don't know!



WHICH WAY DOES IT GO?

Here's a home-grown project from the Far East. This contraption is the result of the ongoing front WD experiments in which our Japanese friends are involved. Early reports are that the in-front-of-the-axle-position motor copes pitifully with jumps, but the car *screams* on the dirt oval. There's a trend toward behind-the-axle motors, much like the production version of the front WD Kyosho Maxxum.

FLOPPY OVAL BURNER?

Reports have it that Composite Craft is testing a new, fully independent suspension, 1/10-scale on-road car at Lake Whippoorwill International Speedway. The cars are powered by Composite Craft's new Redline motors, and it looks like Kim Davis is serious about putting Composite Craft at the top of the 1/10 on-road heap.

Keeping the industry BUGGED, I'll see you next time—or sooner, if I catch you in my spyglass!

CC

READERS' RIDES

Welcome to "Readers' Rides"! We continually receive photos of readers' latest projects, so we've decided to start featuring some of the more innovative stuff to give all our readers a glimpse of these neat cars and trucks, etc. So here we go! If you want to be part of this new feature, send us a nice color photo of your project with a brief description, and we'll show it to the Ayatollah of Radio Controlla at the next editorial meeting to see if he'll publish it!

If we publish your photo, we'll give you a one-year subscription to RCCA, or extend your existing one, and you'll even be eligible for our "Readers' Rides Car of the Year Contest" in the fall of '89. Send your photos to Readers' Rides, R/C Car Action Magazine, 251 Danbury Road, Wilton, CT 06897. Start clickin', shutter-bugs!

This trick-looking Ultima comes to us from Richard Scott of Tampa, FL. His Ultima features a set of Platinum shocks, fiberglass shock towers, ball bearings, a Futaba radio system and a sparklin' set of aluminum wheels. Richard did an exceptional finishing job on the car, and he tells us this is the body he races with!



David Semanik of Broadview Heights, OH, shows us his 1/10-scale Funny Car called Aerone. This car features a G-10 fiberglass chassis, aluminum wheels, and, according to Dave, two D12-3 solid rocket fuel engines!

Chris Perkins of Long Beach, CA, sent us this picture of his sharp-looking BoLINK Eliminator 10 dressed in Elliott Thunderbird trim. Chris's car features a graphite chassis, ball bearings, a Red-Label Dymond motor, a TRC rear axle and a Tekin ESC 190 Pro speed control.



Kenny Annesley of Norman, OK, built this '89 WCM 1/4-scale sprinter for the upcoming race season. The car has a Futaba Magnum radio and currently holds the WCM factory track lap record of 5.516 seconds. The driver inside the car is Sparky Plug. Last year, he and Kenny finished 3rd in the WCM Challenge Series.

TRACK REPORT



THRUST
OR BU

PANDA Cyclone

FROM GLOBAL HOBBY DISTRIBUTORS

by DICK BRINTON

OFF-ROAD EXTRAS- NO CHARGE!

A FEW MONTHS AGO, I tested a car called the Lazer, and if you read that article, you probably gathered that I didn't like the car a whole lot. When I received Global Hobby's* Panda Cyclone, it looked suspiciously like the Lazer. As a matter of fact, both cars seem to use the same chassis.

However, with the Cyclone, Global has corrected the major shortcomings of the Lazer: The Cyclone has metal bushings instead of plastic; the shocks are oil-filled and work well; and the suspension parts are sturdier and function much better. The Cyclone also comes with very straight, three-piece wheels that are painted metallic gold. The gold contrasts vividly with the blue anodized-aluminum side rails and the electric blue shocks and stabilizer-bar connectors—here's a car that stands out in a crowd!

When I saw the instruction manual, which is liberally illustrated with good-quality photos, I thought it would be as much fun to assemble as any entry-level car I've built. Unfortunately, though the instruction manual *looks* fine, it's plagued with errors.

There's no excuse for an importer to sell a product without testing it first. When that product is a car that many first-time buyers will construct, the importer should have a few kits built by novice builders to uncover the trouble spots. From the looks of these instructions, Global didn't do its homework.

Here's a list of errors that I found. Before building your Panda, I suggest that you correct the instructions.

- Page 2, first picture. The gearbox half on the left side of the photo is really the right gearbox half.

(Continued on page 31)

GLOBAL HOBBY

PANDA CYCLONE

Type 2WD off-road buggy
 Scale 1/10
 Sug. Retail Price \$149.95

DIMENSIONS:

Overall Length 14.75 inches
 Width 9 inches
 Height 6.5 inches
 Wheelbase 10 inches
 Front Track 7.625 inches
 Rear Track 7.625 inches

WEIGHT:

Gross (w/bat.) 50 ounces

BODY:

Type Single-seat buggy
 Material Polycarbonate

CHASSIS:

Type Tub
 Material ABS Plastic

DRIVE TRAIN:

Type Pinion and spur
 Differential Planetary gears
 Bearings/bushings Metal bushings

SUSPENSION:

Front: Type Parallel arm
 Dampening Oil-filled shocks
 Rear: Type Solid axle
 Dampening Oil-filled shocks

WHEELS:

Front: Type Three-piece
 Dimensions (DxW) 1.5x3/8 inches
 Front: Type Three-piece
 Dimensions (DxW) 1.5x13/8 inches

TIRES:

Type (f/r) Rubber spikes

ELECTRICS:

Motor 05/540
 Battery Req'd 7.2V
 Speed Controller Rotary, 3-speed/reverse

OPTIONS AS TESTED:

JR Propo Beat 2 Alpina pistol-grip 27MHz radio.

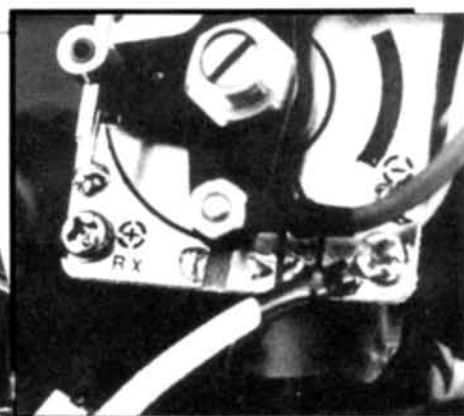
COMMENTS:

Instruction manual has many errors. The Cyclone is a good rendering of an older design. While the solid rear-axle design is limiting in off-road racing, the Cyclone is the best solid-axle car I've seen. This can be a very good car for the first-time off-road driver.

The Cyclone front shock mount showing the setscrew arrangement at its bottom end. Only time will tell how long it will hold.



Here's the Cyclone battery connection. The red wire is connected to the (+), and white to the (-). A photo of this connection is on page 14 of the Cyclone's instruction manual.

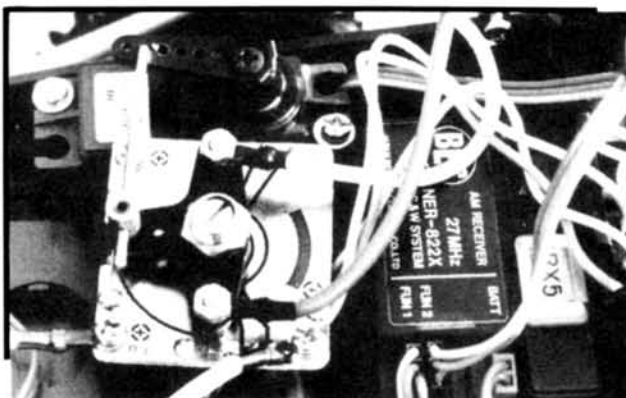


- Page 3, step 5: Lube the gears before closing the gearbox cases.
- Page 3, step 7: Use 3x12 machine screws.
- Page 5, step 13: The instructions refer to 3x8 screws and later in the same step, refer to 3x6 screws. Both are wrong. Use 3x15 screws with lock nuts. There weren't any 3x8 self-tapping screws in this kit, anyway. In addition, the pre-drilled hole is 2mm, so you'll have to drill it to 3mm.
- Page 7, step 18: The flat-head machine screws are 3x8, not 3x6.
- Page 7, step 19: There are no directions as to how deep to sink the ball screws.

The photo shows them too high. Screw them in half-way.

- Page 7, step 20: Same as step 19.
- Page 7, step 22: Installation of the front axle is omitted in the instructions.
- Page 8, step 23: Photos are confusing.
- If you can get through steps 21, 22, 23, 24, and 25 without too much hair pulling, you can build a car for me anytime!
- Do steps 35, 36, 37, and 38 before you do step 26. They're much easier to do at this stage than after the front end is assembled. As a matter of fact, step 37 can't be accomplished with the front end on the car.
- Page 9, step 30: Measurement is 2³/₁₆, not 2⁵/₁₆.
- Page 10, step 33: Since the rear tires are directional, the center piece is installed inside the rear tire only one way—

(Continued on page 92)



The speed controller mounts next to the servo with a short linkage rod while also keeping clear of the motor wires.

ELIMINATING

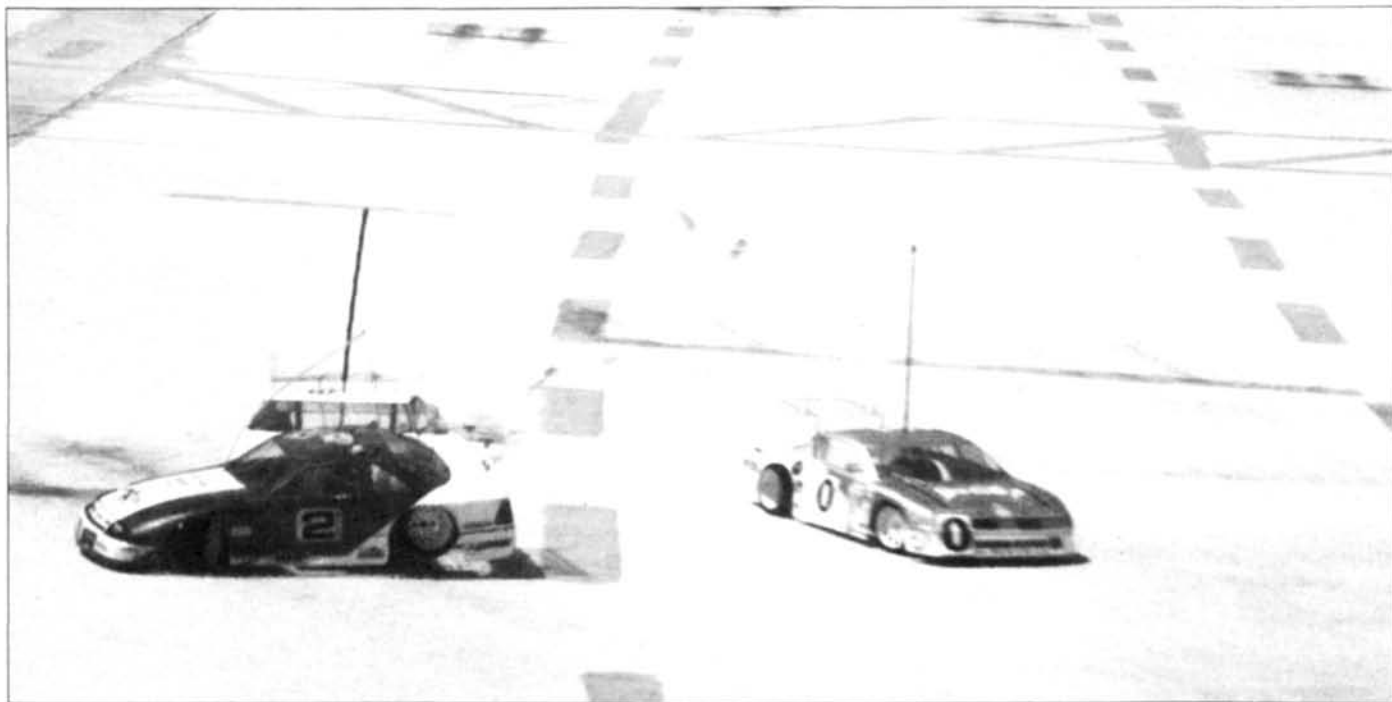
RADIO

PART I

GLITCHES

by DONALD AMBERGER

HOW TO IDENTIFY SOURCES OF INTERFERENCE



THE BASIC THEME of many R/C articles is that cars should be ready to race before you hit the track and that readiness can only be ensured by a thorough bench-test on the night before a race.

A beginner will first give his car a cursory once-over. After he's lost some races because the wheels fell off or the shock tower finally broke, he gets better at recognizing potential disasters and can take preventive measures *before* disaster strikes. The emergent expert realizes that the *total* mechanical package must perform, and this total package must also hold together under the most grueling racing conditions. Anything short of perfect reliability will surely produce less-than-satisfying results.

Electronics, Racing and Reliability

The electronics and the electrical system are probably the most overlooked of the factors that affect racing reliability. This is because most racers can easily repair *mechanical* defects, but they simply don't have the know-how to see when something electronic is only just barely working. Most racers can look at motor brushes, clean them appropriately, and so on, but how many can "look" at a receiver and declare it operational? How, for example, do you *know* that your transmitter is producing the correct signal? Can you be sure your electronics will work flawlessly for the next race? Do you ask these check-out questions, and if you do, do you know the answers? How many

hours have you spent repairing glitch-induced damage?

In this two-part article, I'll present all the available information on glitches, and I'll help you to use this information to establish good pre-race practices. My son Robert enjoys racing 1/10-scale cars. At Island Hobby Raceway, we race with a very competitive group, and any car that falls below certain competition standards will end up without points or racing in the lower Mains. Sometimes, our Eliminator 10 will run extremely well, but on other days, this car will behave inconsistently. What causes this?: insidious glitches. These, and other subtle electronic defects will inevitably cause even the most perfect car to run inconsistently. To become

expert, a racer must at least be *consistent*. Only when he achieves consistent results can the car be modified to produce even *better* results. Of course, driving skills are important, and these skills must improve if you're to win, but consistency is also critical to success.

Don't Accept Glitches!

I'll describe glitches and other loss-of-control problems, but, more important, I'll

that affects the desired results and can't easily be repeated. A glitch is an unwanted surge of electrical power, and it's often thought to be a minor problem.

Examples of Glitches

To the dismay of its driver, a car tearing along the straightaway suddenly turns into the side-boards and smashes its front end. What do we do? We fix the front end, and the glitch doesn't show up until two



tell you how to *solve* these problems methodically. First, please accept the fact that glitches should *never* occur and should *never* be accepted with a shrug or dismissed as once-in-a-blue-moon happenings. I know one racer who says, very matter-of-factly, that his car *always* has glitches and that glitches are a way of R/C racing life. No way! Electronics that fail to operate perfectly *all* the time just aren't acceptable!

Glitches: a Definition

In the electronics industry, a glitch is defined as any brief, false, electronic signal

weeks later. The hottest car on the track lines up in the Main; the starting buzzer sounds; the "hot" car fails to start. Or how about, "I always take it easy in the near turn, because I get glitched."

Causes of Glitches

Glitches are caused by an unwanted electrical signal bothering the receiver or causing the receiver/transmitter to operate outside the manufacturer's design limits. This sounds simple, but most of us truly don't know what to do about glitches, except on a trial-and-error basis. Even at best, we couldn't guarantee that

we'd solved our glitching problem.

There are many causes of glitches; sometimes, *more* than one cause, and here's a list of possible ones:

- Arcing of the motor, which causes radio-frequency interference (RFI)
- improper antenna length, which desensitizes the receiver
- improper routing of the antenna, which desensitizes the receiver
- improper lead lengths and routing of leads
- intermittent connectors and fuses
- intermittent on/off switches
- improper mechanical layout of electrical/electronic components
- intermittent failure of receiver/transmitter caused by broken PC board, bad component, etc.
- operation of receiver at too low a voltage
- contamination of third-order intermodulation
- RFI from a source outside the racetrack.

The two basic methods to eliminate glitches are:

1. Build your electronics package using good design principles.
2. Correct your electronics package after the car has been put together.

Build your Electronics Right the First Time

You can prevent glitching by building your car properly. If the car is already built, you'll have to make modifications, but doing things right initially will save you hours and dollars later. When you follow good electronic-design practices at the beginning of a project and know the ground rules ahead of time, the project will usually turn out in good shape. Build-in all the necessary "precautions" ahead of time, and for this you'll have to know how to avoid obvious errors during the building stages.

(Continued on page 128)

HOT TRACKS

by DANNY BATINICH

One Stop Hobbies and Raceway

Welcome to "Hot Tracks." Each month, we'll choose an outstanding track to feature in this column from a number of entries. To qualify, send in some high-quality black-and-white photos of your track, along with approximately 500 written words, outlining why your track should be chosen. Send your entries to Hot Tracks, Radio Control Car Action, 251 Danbury Road, Wilton, CT 06897.

THERE ARE TRACKS of all kinds in Southern California: dirt off-roads and ovals, asphalt on-roads and ovals, indoors and out, but, until recently, the only indoor tracks were carpeted. We now have an indoor, banked, *asphalt* oval.

One Stop Hobbies and Raceway in Los Alamitos, CA, is the first indoor paved racetrack in Southern California. The oval track is 170 feet long on the inside lane, and it's 10 feet wide all the way around. As you travel around the track, you start out on a 7½-degree bank down the straight. Just into turn one, the banking increases to 20 degrees and you sweep through turns one and two. Down the back

straight and into turn three, the track once again banks, but only to 15 degrees; through turn four, then back to the front straight and the finish line.

As I drove the course, I likened it to the short oval tracks I raced on during my full-size stock-car days. The action is fast-paced, and mistakes can be costly in many ways.

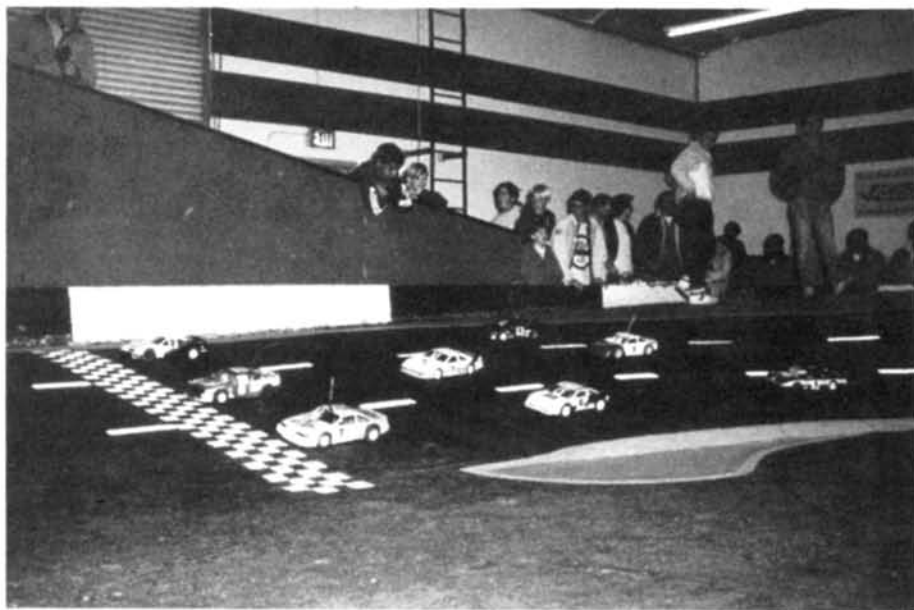
The owners of One Stop, Steve and Cheryl Schooler, have been in the hobby business for three years and opened the racetrack about 18 months ago. At first,

the track's surface was dirt, but it was recently changed to asphalt. Since the change, the track's popularity has grown, and it now supports racing on three nights a week. The Schoolers are also planning to hold NORRCA-sanctioned events in the near future.

There are more-than-adequate pit facilities (enough for 80 racers) and both AC and DC power hookups are provided. For convenience, the hobby shop is open to the racetrack, and it's properly stocked to handle racers' needs. Any minor drawbacks of an indoor track are easily forgotten when the racing begins.

Radio-control racing is a rapidly growing family-oriented sport. Steve, Cheryl, their three children, Angie, Nick and Jake, along with all their employees, maintain a welcoming family atmosphere in their facilities. Spectator seating around the track is an added comfort for those who just came to watch.

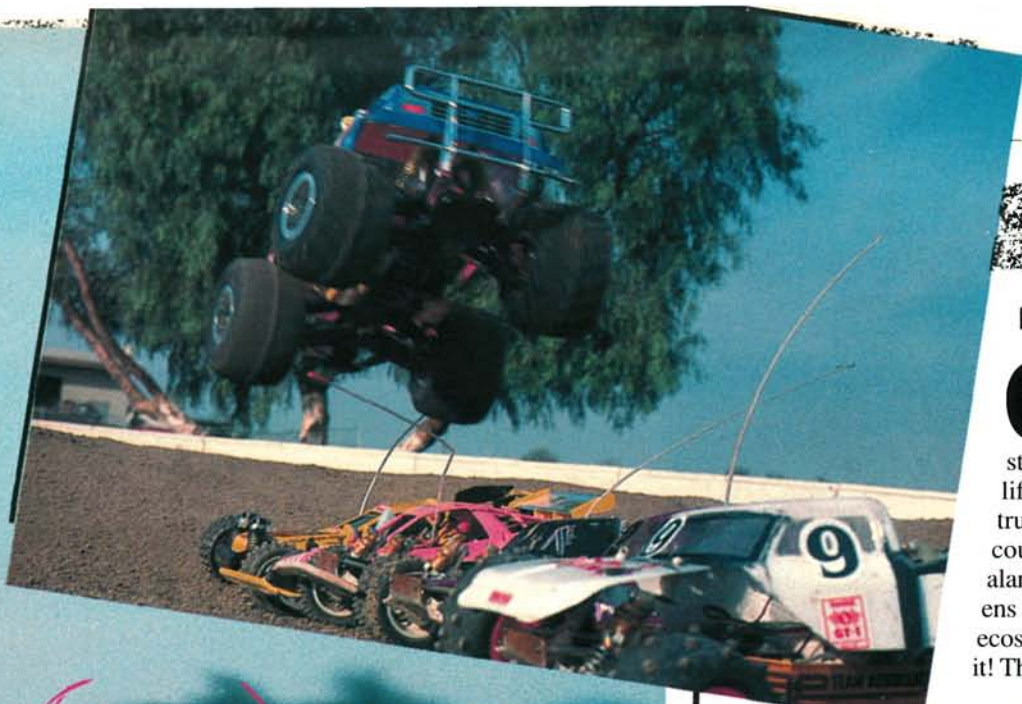
One Stop Hobbies and Raceway is located at 3782 Cerritos Ave., Los Alamitos, CA 90720. Races are held on Tuesday and Friday nights and on Sunday afternoons. A visit to One Stop Hobbies and Raceway will be enjoyable for all. ■



TRACK REPORT



STAR-SPANGLED



by RICK HOULE

OH, NO! Not another monster truck! The proliferation of monster truck kits in this country has grown alarmingly and threatens to upset the entire ecosystem as we know it! These rock-crushing,

ROYAL CRUSHER

car-stomping behemoths aren't only increasing in numbers but also in species and, if left unchecked, humans will soon be outnumbered, and there will be no place left to hide!

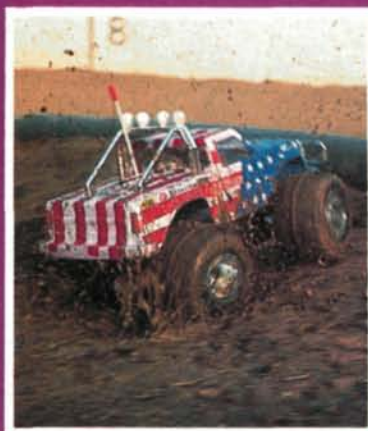
In a desperate act of self-preservation against these hordes, Royal Products Corporation* has produced the Crusher to meet the monster invasion and save humanity! One must fight fire with fire!

At first glance (particularly in the picture on the box showing the Crusher crushing cars!), the Crusher looks like your typical monster truck, but the kit yielded many not-so-typical features.

THE KIT: The Crusher is a 2WD, 4WS, all-American monster truck! If you're used to seeing the graphic masterpieces on the packaging of the typical Japanese products, you'll find the Crusher's box neat, but not breathtaking. Every part is conveniently poly-bagged, blister-packed, or separately boxed.

When I first picked up the polycarbonate body, I thought there was something wrong with the material because it looked hazy and

BANGER

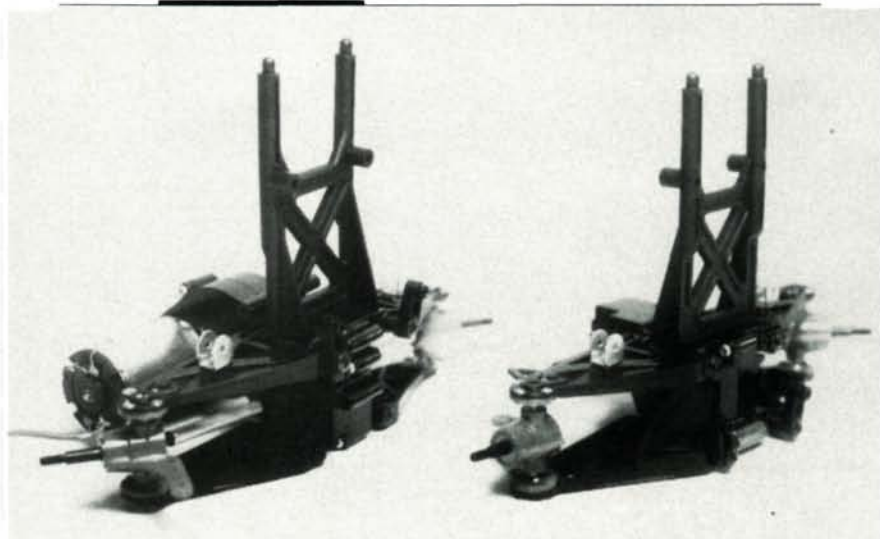


ROYAL CRUSHER

wrinkled. Then I discovered that it was covered with a protective plastic wrapping put on at the factory! This plastic covering protects the exterior finish while you paint the shell, and it should only be removed when you've finished painting. If you've built this type of truck before, you'll probably be adding some familiar tools to your pit box, e.g., a four-way box wrench, an open-end wrench and an Allen key. The kit also includes a small

plastic jar of Switch Lube (enough for a lifetime), a tube of grease and a small bottle of the most pungent-smelling liquid threadlock I've ever come across! The items you'll need to complete assembly are: Phillips screwdrivers (large and small), long-nose pliers and diagonal cutters. To operate the Crusher, you'll need: a 2-channel radio, a 7.2V battery pack and a receiver with two servos.

Right away, step No. 1 was a real mind-blower! The first thing Royal wants you to do is *boil*—yes, that's right, *boil*—certain plastic parts in a solution of vine-



Front (right) and rear (left) suspension assemblies. Rear assembly contains the motor, gearbox, double wishbone arms, axles and body posts. Front assembly includes empty gearbox (Royal has a 4WD conversion kit with gears for this box), double wishbone arms, axles and body posts.



The clear Lexan chassis cover allows for easy visual inspection but still keeps out the dirt.

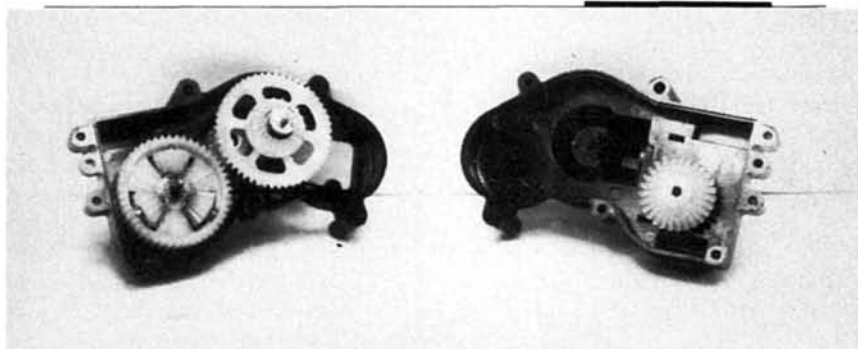
gar and salt in a pan of water for *three hours!* Now, just the thought of a pan of boiling water sitting on the stove for three hours in the same house as my two young children (who, by the way, thrive on looking for trouble) was out of the question, and I sure wasn't going to stare at a pan of boiling water for that long! The parts in question are primarily the wishbone suspension arms, the skid plate and the body posts, and boiling supposedly increases their strength and flexibility. However, I've always thought that ABS resin was a superior grade of plastic and if these parts are made of ABS, as the manufacturer claims, why do they require all this fuss? Needless to say, I elected to forego this step and to take my chances with a parts breakdown.

The instruction manual is very well laid out with lots of clear mechanical drawings to help you with the assembly.

The small hardware parts are all arranged in poly bags and grouped so that each bag contains only the parts you'll need for a particular step. Though each of these bags has a brightly colored header card taped to its top, the cards had no details about what step the parts were for or which parts the bag contained. Fortunately, the parts are easily identified without opening the bags, so just pay attention.

ASSEMBLY: The first three pages deal with the construction of the gear case and the motor installation. Assembly is straightforward and simple, but when my gear case was bolted up, something was amiss inside, and the rear output shafts were hard to turn by hand.

When I tightened down all four of the 3mm, self-tapping screws that join the two halves of the gear case, the axles wouldn't turn. If I backed off the screws



Inside the transmission, you'll find a differential that uses planetary gears. Make sure these gears are meshing properly when you bolt the tranny halves together.

ROYAL CRUSHER

Type 2WD monster truck
Scale 1/10
Sug. Retail Price \$109.95

DIMENSIONS:

Overall Length 18 inches
Width 12 1/2 inches
Height 12 3/4 inches
Wheelbase 10 inches
Front Track 9 inches
Rear Track 10 inches

WEIGHT:

Gross (w/bat.) 5 1/2 pounds

BODY:

Type Ford pick-up
Material Polycarbonate

CHASSIS:

Type Tub
Material ABS Resin

DRIVE TRAIN:

Type Pinion/spur
Differential Planetary gears
Bearings/bushings Brass bushings

SUSPENSION:

Type (f/r) Twin wishbone
Dampening (f/r) Friction coil-over shocks

WHEELS:

Type (f/r) Chrome monster wheels
Dimensions (DxW) (f/r) 2.6875x
 2.9375 inches

TIRES:

Type (f/r) Monster-tractor type

ELECTRICS:

Motor Mabuchi 1 RS-540S
Battery Req'd 7.2V 6-cell
Speed Controller Mechanical resistor-type, 3-step forward and reverse

OPTIONS AS TESTED:

Airtronics XL-2P radio system.

COMMENTS:

Turns on a dime, lots of suspension travel and runs smooth. Royal includes brass bushings instead of plastic: This is a great improvement that other manufacturers should follow. At its current price, the Crusher is a real deal for the monster-truck market.

Wanted:

AUTHORS CONTRIBUTORS PHOTOGRAPHERS



We think a lot of our readers have ideas that are worth sharing. How many times have you read an article and said "I could do that!" or "That's not the only way to do that; mine's easier!" Could very well be! Here's your chance! We'll be expanding **Radio Control Car Action** and are looking for additional contributors to help us accomplish this objective. Of key importance is the ability to take good photographs; the writing we can help you with. Interested? It's much easier than you might think.

Let's hear from you. Send in your ideas, articles, thoughts and photos; we're looking forward to it.

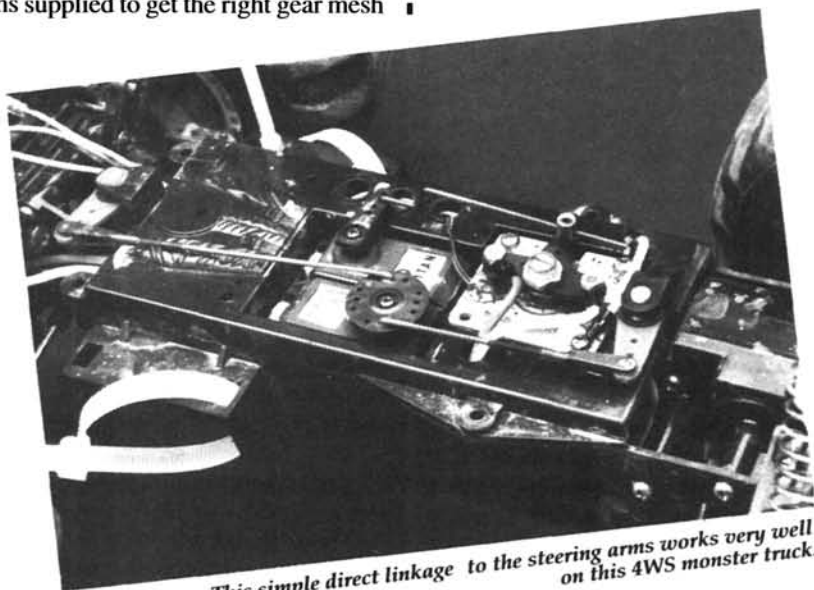
**RICH HEMSTREET
R/C CAR ACTION
AIR AGE PUBLISHING
251 DANBURY ROAD
WILTON, CT 06897**

so that there was a gap between the halves of the case, the shafts would rotate freely. I disassembled and reassembled the tranny three times to check the alignment of its innards, but the situation remained the same. Finally, I backed the screws off just before the case began to separate and decided to try running-in the drive train to loosen things up inside. I installed the motor using the shims supplied to get the right gear mesh

made of *brass*, so I used that.

Though the kit included enough Switch Lube to kill a horse, there wasn't enough gear grease to fully lubricate the tranny innards and suspension shafts, so you should have some extra grease handy.

The kit contains a rubber balloon that's to be put around the motor, but I'm not



This simple direct linkage to the steering arms works very well on this 4WS monster truck.

on the pinion. (Unfortunately, you can't see the actual mesh 'cause it's inside the case, so you just have to assume it's correct.) I ran the motor for about 30 minutes with a 6V power supply (four AA cells), and it did loosen up a bit. When I eventually backed the motor pinion off the spur gear by adding another shim, the drive train began to spin a lot more freely. The output shafts are secured inside the tranny by rather crudely made C-clamps, and the fitting of these could have something to do with this mystery.

Without doubt, the worst problem I had with the Crusher was with the TR-3 ball joints that had to be screwed into the servo-savers. The Phillips-head slots on the top of each one weren't very deep, and they stripped easily, even after opening up the holes in the plastic with an X-Acto. Instead, I wound up using Kimbrough* ball ends here. There are 13 brass bushing in this kit, but identifying them is easy: Eleven of them are large and two are small.

Part "MBA-4" is described in the instructions as being made of plastic, but the closest-looking thing to this part was

crazy about sealing the end bell of any motor, so I left this item off. Sealing motors restricts air flow and causes overheating.

From this point, the rest of the assembly went fairly smoothly, albeit tediously. There isn't much spare room left in the chassis after the Airtronics* XL-2P receiver and servos have been installed, so some radio systems might be a tight fit.

Wheels and tires couldn't be any easier to install: Simply pull the giant tires onto the one-piece chrome rims. The tread patterns are directional, so be sure to get the left- and right-hand sets pointing in the right direction.

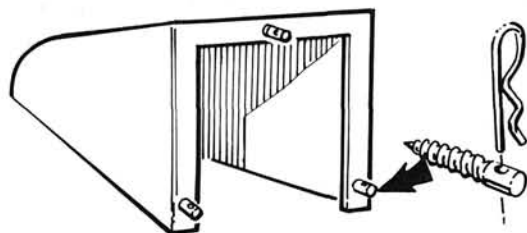
A clear polycarbonate cover keeps the dirt out of the electronics, and by carefully trimming this cover, you'll ensure a good seal. A bead of silicone sealant around this piece, as well as the tranny case, would be a good idea.

The bright yellow friction-type coil-over shocks are pre-assembled and are easily installed onto the body posts and wishbones. The front and rear body posts look identical, but the top shock-mount

(Continued on page 130)

PIT TIPS

by JIM NEWMAN



BLACKFOOT SERVO ACCESS

This simplified diagram shows a speedier method of accessing a Blackfoot/Monster Beetle servo and speed controller. Remove the heads from three screws, cross-drill for body clips, then screw into the cover as shown.

Robert Stewart, Valparaiso, IN



TOOL JUG

Remove the front of an empty plastic jug and cut small slots in the sides. Cut shelves from 1/8-inch plywood or Masonite, leaving tabs on the ends to engage the slots. Snap the shelves into place and, if required, glue small strips to the front edges to stop small tools from sliding off. You could also punch holes in the cap for small screwdrivers.

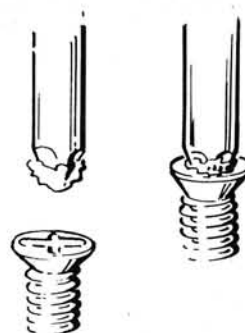
Isaac Redig, Winona, MN



WORN PIVOTS

A common problem with the Hornet/Grasshopper is that the in-board plastic pivot pins of the A-frames wear rapidly. To refurbish them, cut 1/4-inch-long pieces of 3/16-inch-diameter K&S brass tube, and press these pieces over the worn pivots. Then drill out the holes to suit the metal tube sleeves.

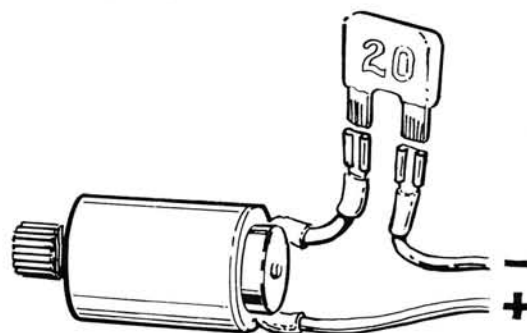
Tom Tice, Sewell, NJ



SCREW STARTER

To make it easier to start a screw in hard-to-reach places, some method of holding the screw to the screwdriver is needed. Put a blob of sticky grease on the end of the screwdriver!

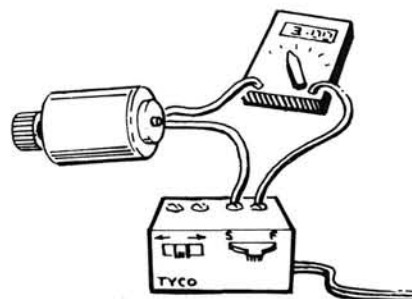
Bill Carr, Edwards, NY



FUSE PROTECTION

To prevent stalled motors from burning up, model plane fliers install a 20-amp automotive fuse. It's easy to do this by soldering or crimping spade lugs into a motor lead, then plugging the fuse cartridge into the lugs.

Mark Simecka, St. Mary's, KS



MOTOR BREAK-IN

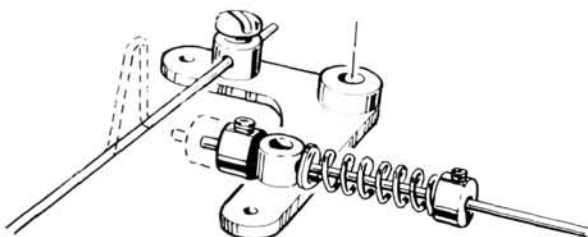
This car owner connects his new motors to an old train transformer so that he can select his own speed and save on D-cells. To keep a check on things, a voltmeter in the circuit is helpful.

David May, Smithfield, NC

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

PIT TIPS

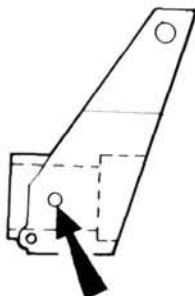
by JIM NEWMAN



BRAKE OVER-RIDE

The .10-size Kyosho cars use a V-bend in the carb pushrod (dotted). Stretching this V-spring is hard on the servo and causes high current draw. It's better to eliminate the V by using two model plane $\frac{1}{16}$ -inch-diameter wheel collars and a ball-point pen spring. Dotted lines show how the spring compresses, allowing the pushrod to slide through the pivot. A softer spring is easier on the servo.

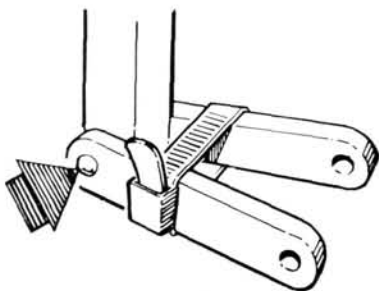
Nate Estep, Oakland, CA



RC10 BEARING CLEANING

To make cleaning easier, drill a $\frac{3}{32}$ -inch hole through the side of the rear hub carrier (arrowed). Insert the nozzle of a pressure can into the hole, and blast dirt out of the bearing in the opposite direction from which it entered. Then spray your favorite lube into the hole, and seal with tape or a "plug" cut from a toothpick.

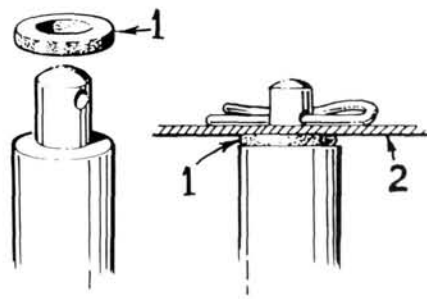
Kerry Stevens, Spokane, WA



SECURE PIVOTS

The ball joints can pop open on Icarus or Pegasus A-frames. To cure this, tightly strap the frames with nylon tie-wraps. Tightly twisted brass wire wrapping would also work.

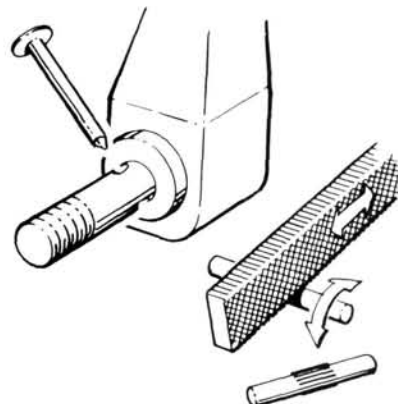
Mark Simecka, St. Mary's, KS



NO BODY RATTLES

Cut little rings from surgical rubber fuel tubing, or use small O-rings. Place these on the body posts before putting the body into position, and compress them lightly before inserting the body clips.

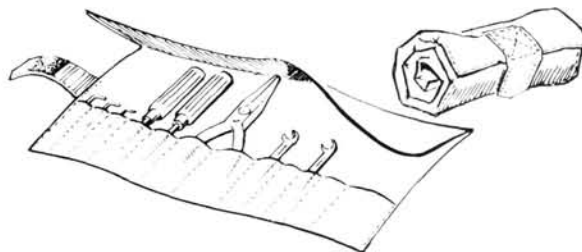
Mike Layden, APO, NY



REPLACEMENT DRIVE PINS

Ben has found that some common household nails fit well in the rear axle. Just cut them to length and file the ends smooth. For a tighter fit in the holes, place the pin on a hard surface, e.g., a table saw, then, using considerable pressure, roll the pin back and forth under the edge of a file to raise a slight knurl on it.

Ben Webster, Monrovia, MD



DENIM TOOL ROLL

An old pair of jeans, some wide fabric tape, a piece of Velcro and a little sewing-machine time will make a handy quick-pick tool roll that's very useful on the pit counter.

James Gaede, Larned, KS

EURO-ENDURO

KYOSHO'S MERCEDES AND BMW MINI STOCKER



by STEVE POND

FOR MANY OF US, radio-control racing is a regular, fun activity. It combines driving prowess, technical and experimental know-how, and the challenge of competition. For the few of us who are fortunate enough to live in a climate that permits outdoor racing year round, 1/10-scale and larger seem to be the most in demand. But for the other 95 percent of us, the inclement weather of the "off-season" hampers our racing efforts. If you live in an area that's limited to outdoor tracks, your only alternative is to sit at the workbench and wrench your car until the weather permits you to race. If you live in a community that has indoor tracks large enough to air out your 1/10- and 1/12-scale cars, that's great—but finding suitable space isn't always that easy. So what's the alternative?

Within the past year, a number of different cars have been introduced in scales ranging from 1/14 to 1/24, and they're all designed to be guided by a new breed of radio equipment. The

uninformed have often dismissed these cars as toys, but they're actually stout performers and can be run in areas as small as the average basement. We don't recommend that you spend your last dollar on another type of R/C car for the sake of attending the track religiously, but for those of you who want to hone your skills during the off-season, or if you just can't get enough of racing and are confined to small areas, these cars offer a viable alternative.

Kyosho's contribution to mini-scale racing includes a pair of 1/20-scale Mini Stockers dressed in either Mercedes or BMW trim. In a scaled-down version, these cars have many of the same features as the popular 1/10-scale cars, including 4-wheel independent suspension, coil-over shocks, lightweight Lexan bodies, durable ABS and aluminum parts, rechargeable Ni-Cd batteries and radio systems similar to those we're used to using for larger scale cars. Although the electronics are scaled down to fit under the smaller hood,

there's no performance compromise. The Pulsar radios are the very same that are already being used by many 1/10- and 1/12-scale racers, but the difference is the micro servo and the combination receiver/electronic speed control. For obvious reasons, the servos are smaller (yet they have no problem slinging the wheels around) and, for space and weight considerations, the speed controller and receiver are combined into a single, small, functional package.

Although we haven't had the chance to put these cars through their paces, they represent another avenue in which R/C enthusiasts can satiate their competitive urges. These cars are relatively inexpensive, and there isn't a lot of room for you to blow money on after-market and high-performance parts. So, if you're sitting at your workbench reading this and wondering why you're not racing, it could be because you don't have one of these to run at the neighborhood basement track. ■

DIRT DIGEST

by BILL O'BRIEN & BOB KANE

WATCH THAT WASHER

WE THOUGHT WE'D use the front of this column to tie up some loose ends—things we'd promised to cover, but haven't yet had time to discuss. The weak of heart shouldn't read this month's column all the way through—Bob Kane actually *writes* at the end! This sounds like a good place to talk about a toothless Kyosho* Burns.

Burnt at the Track

Have you ever had one of those days when everything was going so well that you just *knew* something *terrible* was going to happen? It was like that the last time I had my Burns out. This wild beast 1/8-scale gas car is, in my humble opinion, the best off-road car in its scale. It should be; by the time you're done with it, you'll have spent an arm, a leg and some hair follicles. I was running it in an open field, and it was performing superbly. I threw it into tight corners that forced it up on two wheels; I did donuts in the dirt; I even did a full flip that ended with the car right-side up and running. On that day, the Burns and I could do no wrong. It's a shame I hadn't counted on the *other* days!

After pulling it into the pits, gassing up and restarting the O.S.* .21 VR-B, I nailed the throttle. The engine roared, the Burns moved forward about 4 inches and rolled to a stop. The most articulate thing I could come up with was, "Huh?" A quick check showed a disaster: The spur gear was stripped. The most appropriate question was "How?"; the answer was painfully obvious. The clutch/pinion gear assembly was sliding all over the place and had done a surgeon's job on the spur gear's teeth. Why that happened had nothing to do with Kyosho or the Burns—just my own intrepid behavior.

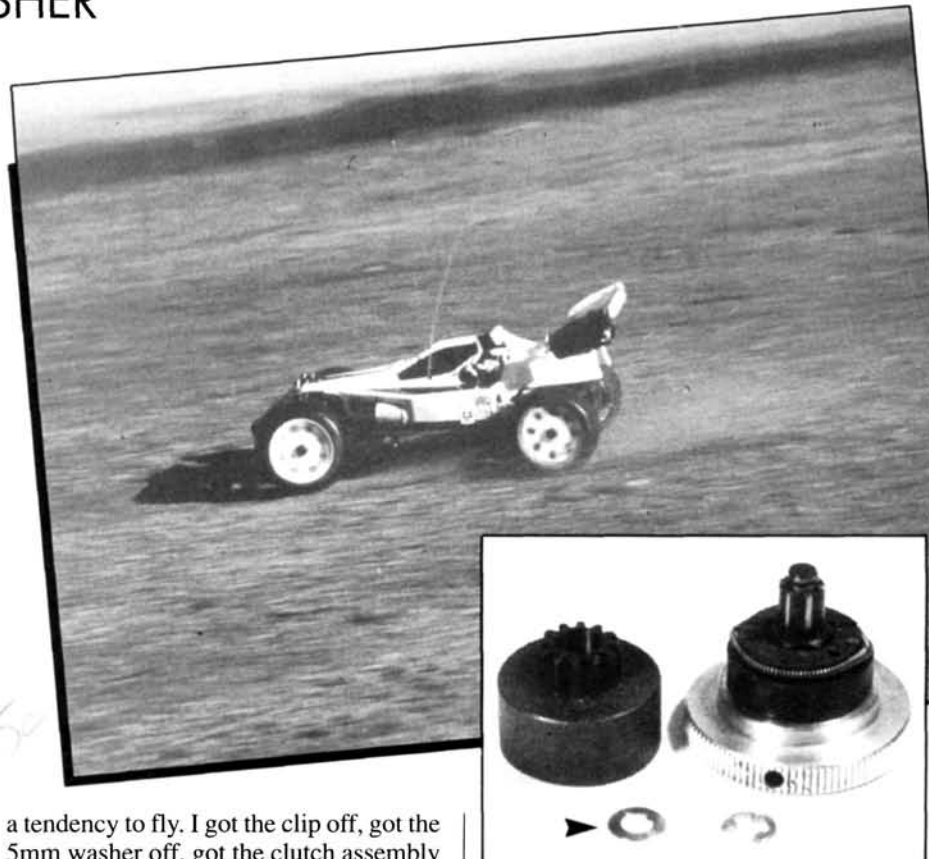
Somewhere around the second time I'd ever cranked the engine (must have been a month before), the knurled starter wheel loosened up on the crank. Tightening it meant disassembling the entire clutch assembly. It isn't something that you'd want to do in the field, because it means taking off a C-clip, and those things have

a tendency to fly. I got the clip off, got the 5mm washer off, got the clutch assembly with its needle bearings off the crankshaft in good order, and then I practically welded the starter wheel on with Lock-Tite. Unfortunately, when the time came to put everything back, I forgot the washer, and it isn't something you'd really notice. When the clutch shoes are new, their pressure holds the pinion gear in place and it isn't evident that the C-clip is too small to do the job on its own.

After a dozen or so hours of running, the clutch shoes wear down a little and, without the washer, the clutch assembly (with the pinion gear) slides. About an hour later, you can write off one spur gear (between these two events the car ran fine). It's only a few dollars for a new spur gear, but it's a lot of work that you can avoid.

Optima Bones

Then there was the story about the Optima Mid that took a jump and came down on the other side spitting its rear dogbones onto the track. The suspension rod that



This little washer is of vital importance to the clutch/pinion assembly, so make sure it doesn't get lost during maintenance.

holds the rear knuckle in place is, in turn, held to the knuckle by a screw. Even with Kyosho's screw cement, it will vibrate loose—usually at the worst possible time. All you need is a slightly longer screw that will protrude from the rear of the knuckle; cap it with Lock-Tite, a lock washer and a nut. Just don't wrench it in too tightly, because the knuckle has to pivot.

And Now a Word from Bob

Sometimes, in our enthusiasm for a new kit, we focus on construction and follow the assembly manual to the letter. For the novice R/Cer, this is fine and, usually, encouraged, as most kits come with manuals that are at least adequate and some that are even superlative when you're just starting out. However, there will come a time when, with a few kits

(Continued on page 52)

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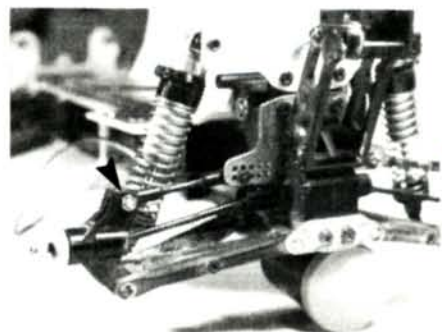
VISA



DIRT DIGEST

under your belt, you'll pick your car up out of the dirt and stammer, "There has to be a better way!" There usually is, and you find it by looking over other models and keeping your mind as open as possible. It becomes one of those "If I knew then what I know now, then I would have etc., etc.," situations.

If you keep your eyes open, you won't have to wait until you've banged up your buggy to work on improvements; you can start improvising during assembly. Don't take the manufacturer's word as gospel. If you can think of a better way to do something than that described in the manual, try it. When you go to an assembly step, examine it to make sure it makes sense. Here are two examples where the kit and/or directions can be improved during assembly:



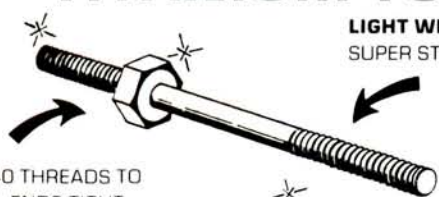
A slightly longer suspension-rod screw with lock washer and Loctite will protect against dropping your dogbones on the track.

• RC10 Spaghetti Conversion: First, let's look at the stock steering linkage of the RC10. Yes, this required immediate attention at the initial assembly stage. It looks as though it has been made from spare parts. It isn't that the stock linkage doesn't work, or that the idea behind it (steering rod that's quickly and easily adjustable) isn't good; it's just that a screw-locking collar binding two rods together reminds me of the movie "The Poseidon Adventure"—a disaster waiting to happen. The solution is simple and inexpensive: a Du-Bro® 378 threaded rod cut to 2 1/8 inches.

Bend the rod at a 30-degree angle 3/4 inch from the end. Two Du-Bro 188 ball-link sockets and two Du-Bro 181 threaded ball links to attach to the end of the rod and the steering linkage and servo horn (respectively) will tie it all together. Total cost: under \$10. (These dimensions are based on use of a JRA servo and the provided steering horn, which Associated® classifies as a medium-size servo. If your

(Continued on page 136)

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by DAVE McNATTIN

JG

ULTIMA MONSTER TRUCK CONVERSION EXCURSION

AS THE 1/10-SCALE R/C boom continues, the latest explosion is in the direction of conversions, from wild, fast off-road cars to fast, crazed monster trucks. If

techniques. (My driving has often been compared to the Blue Angels—mostly inverted.) Anything that has survived an entire season of my racing, with only an occasional



ever you thought boredom might set in, just let one of these heavy-metal truck racers grab your throttle finger.

In my case, I just happened to have my trusty, mud-splattered, tire-worn Turbo Ultima sitting there just begging for a new life. Because it's light, yet very rugged, the Ultima is a great choice for a conversion vehicle. It loves flying, yet it still has enough suspension travel and sufficiently heavy Platinum shocks to absorb the most rambunctious driving

gear change and lube is what I'd call *true* monster material. After a quick trip to my local sweet shop (or hobby emporium), I had all that was required to disguise my well-known racer. Would anyone guess my new toy was actually the terror of the track from last season? No way! My track monster has become the stadium king. To the basic conversion package, I only needed to add some really neat CRP* Blackfoot wheels with a set of bearings to match, and I was

ready to begin.

J.G. Manufacturing* has covered the transformation process very well: from body mounts, heavy-duty shock towers and bumper, to new spindles, radio tray and awesome pre-painted body. This package gets you from dreamin' to steamin' with just a short stay at the workbench.

Everything is just a bolt-

on. This also explains the reasoning behind using the Kydex-type material for the body mounts: They provide a very secure mount that won't rip out, and some cushion for that unavoidable lid skid.

After dropping the new monster-weight radio tray on top of the chassis, I turned to those front spindles. Though the originals are pretty



Completed JG Ultima truck conversion. Upper fiberglass radio plate adds rigidity—a welcome feature, considering the abuse monster trucks receive.

on replacement with no major tear-downs required.

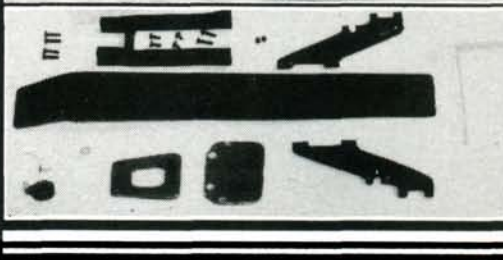
A new bumper is provided, and its shape shows the amount of thought that went into the design of all the parts that were included in the package. Small, yet efficient, is the idea here. By rounding those square corners off the original design, the new plate keeps your boon-docker from hanging up on any obstructions. With the wheel size that you add to your already well-suspended Ultima, only minimal protection is needed anyway.

As I replaced the shock towers, I realized that they would double as body mounts, and *that* body would eventually imitate Evel Knievel at the Snake River Canyon. So beef is important here to hold the lid

stout, those huge wheels will exert a tremendous amount of pressure on the suspension, and increasing the size of the spindles is a must. Larger spindles also allow the use of fairly common 5x11mm bearings. These are a perfect replacement for the originals, and J.G. is to be commended for engineering these pieces. There's nothing as aggravating as having to put down your project while you take care of some minor misalignment or quality-control problem that originated at the factory.

I chose CRP wheels because the company has a very good line of quality wheels that can be dyed or left in their natural color. I've found the CRPs to be light and true, as well as classically good-looking. This

(Continued on page 58)

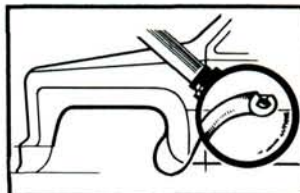


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Priced affordably, this kit includes all parts for easy conversion (shown above).

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JG ULTIMA MONSTER TRUCK CONVERSION EXCURSION



Above: Author used fine-tip permanent marker to make easy panel detailing.

was my first attempt at dyeing wheels, and I found it very simple, except for one thing: The length of time that the wheels are immersed really affects the results. Wanting a *strong* yellow, I left them in longer than recommended, and when I pulled them from the

dye, they were *pumpkin orange*. Whoops! When the guys at the track laugh at them, I just say that anything brighter would be gaudy, and *next* time, I'll check them earlier and be satisfied, I'm sure. Anyway, the heavily spiked tires fit on the rims very nicely and they go right on and stay on. Once

mounted, I slipped the wheel adapters on, then the tire-wheel combination, and it was almost play time. As you sit back to admire the job, you'll realize why this is called a monster truck! We're talking *awesome*, with dirt-digging spikes hanging out all over! If it weren't for the body mounts, this little

terror could throw mud either right-side-up or upside-down.

I thought the prepainted J.G. truck body was better-looking than any of mine, so it was my choice to cap off this monster. Mounting is straightforward—just a 5-minute operation after trimming.

Speaking of trimming, if you have your own technique that works well, skip the next part of this article. However, if you're embarrassed when your freshly trimmed bodies are seen in public, try this good old method: Lay the body over the edge of your workbench so that the area to be cut is flat and supported. Hold a straightedge along the line to be cut. Now, with a new No. 11 hobby knife, lightly score the line. Don't try to cut through now; just score it. After that, fold the edge back and forth until it breaks off cleanly. For curves, a little freehand is necessary, but it's just as easy. When you've lightly scored the body, flex it along the score, then gently separate the two sides. Trust

ULTIMA MONSTER ROOTS

by STEVE POND

THE KYOSHO ULTIMA was designed as the Far East's answer to

the Associated RC10. Prior to the Ultima's introduction in early '87, the RC10 scored victories at will, but the Ultima was soon able to make its mark as a threat for the checkered flag.

The features of the Ultima include a lightweight aluminum-channel

chassis with a fiberglass upper plate, lower A-arm suspension with adjustable upper links, and four oil-filled coil-over shocks. Doesn't sound much different from many of the other popular off-road cars, but the way these components were designed and put to use is what separates the Ultima from the rest of the contenders.

The Turbo Ultima, which is the base for our J.G. Ultima Monster Truck Conversion, is an updated version of the standard Ultima. To keep pace with the technology that was making the Ultima's competition go faster, the Turbo Ultima had the same base features as the standard Ultima, with the addition of a few high-performance accessories. The add-ons



me: a little scoring and flexing, and any cut can be made smooth or straight.

After mounting the body, step back and enjoy a moment of bench flying this little bruiser. From the rad paint down to those meaty skins on the track, this monster truck means *business!*

There are a few things that I'd change:

- overspray on the body. The style is great and the paint is wild, but it takes some unnecessary time to carefully rub the overspray off an otherwise great body.
- In the tire department, I'd like to have a choice of tractor, paddle, or foamies.

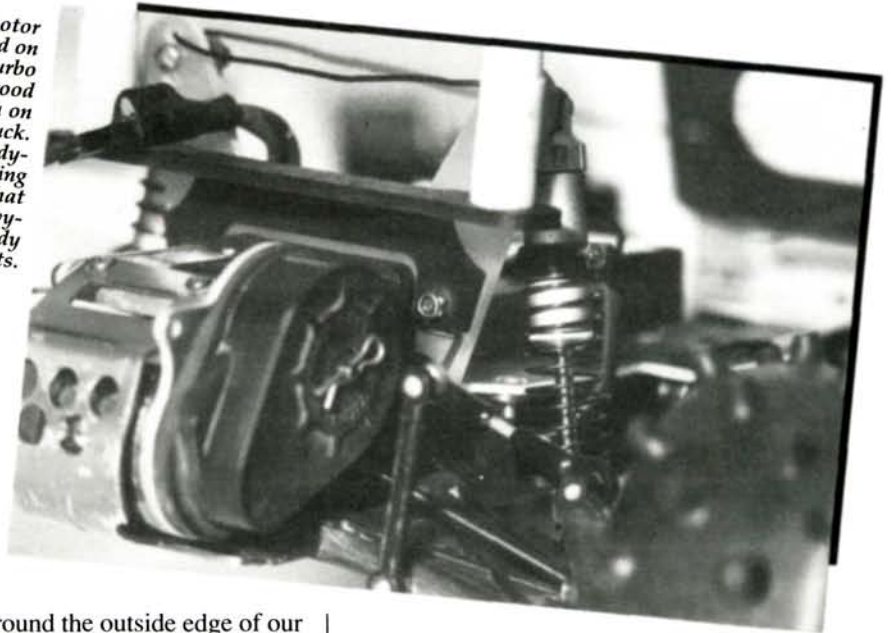
PERFORMANCE: Test time! Hey! I like it. After dropping to a smaller pinion to compensate for the larger tires, this baby *moves*. Jumps are no trouble at all; in fact, I was looking for bigger and badder jumps almost from the very start.

Blasting around the track just isn't enough. The berm



The upper radio plate provides plenty of mounting surface. The Platinum shocks and JG's towers are a good trucking combo.

The motor guard on Dave's Turbo Ultima is good protection on any truck. Note the body-post mounting plate that holds heavy-duty body posts.



include a thinner (2mm) aluminum chassis with the same fiberglass upper plate, a ball differential to get the power to the ground as smoothly as possible, ball bearings in place of the original plastic bushings, a smoother set of Kyosho Platinum oil-dampened shocks, and front and rear stabilizer bars. What this adds up to is an extremely competitive package that was the basis of Joel Johnson's World Championship winner.

It's easy to see why J.G. chose to make a conversion for the Ultima, and, just as the Ultima joined the RC10 in the 2WD off-road spotlight, with this conversion, it might now take honors in the world of monster trucks. ■

around the outside edge of our club track was just too tempting. Now I think it's time to rebuild our track with more tabletops and camelbacks. The sight of my Monster Ultima climbing for the sky is what I'm looking for now. Enough of that flat-track stuff, give me the *stadium* racers. With its nose in the air or digging for gold, this is what off-roading is all about.

I think John Gudvangen has jumped right into the middle of a new trend that can shake the doldrums from anybody's race day. With only a little time at

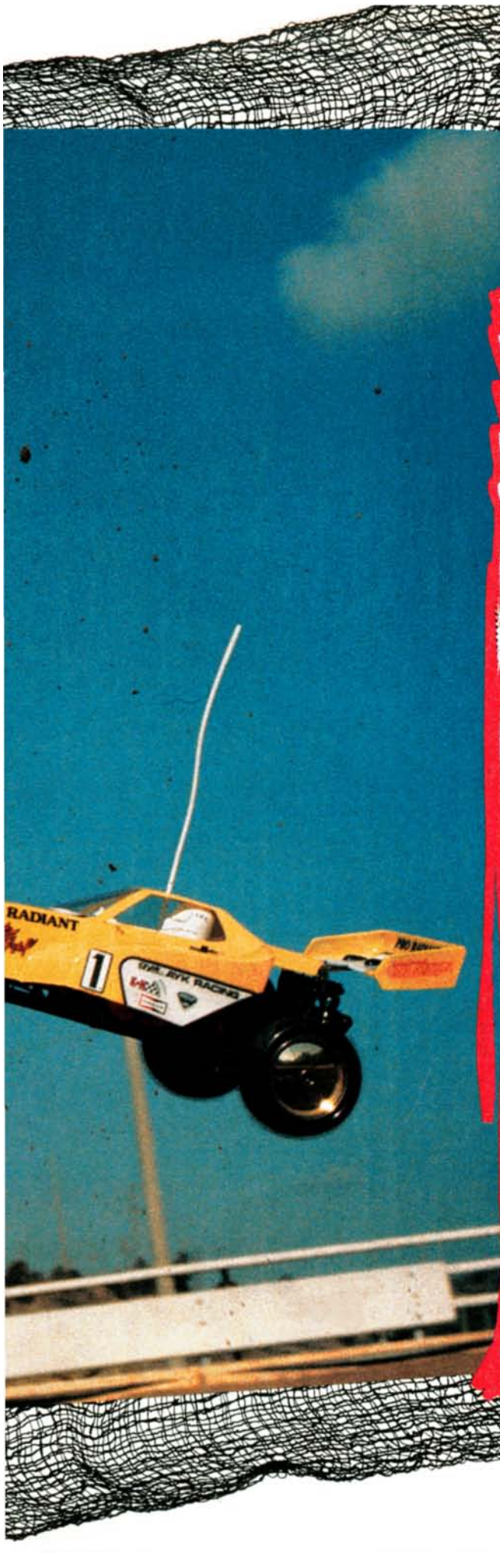
the bench, your favorite off-roader can become king of the stadium racers.

**Here are the addresses of the companies mentioned in this article:*
Custom Racing Products, 3250 El Camino Real B-3, Atascadero, CA 93422.
J.G. Manufacturing, P.O. Box 6014, Whittier, CA 90609. ■

TRACK REPORT



AYK
**PRO
RADIANT**



AIR TIME

by MIKE LEE

PERFECTION. It's something for which many people strive, and just when you think you have it, someone takes "perfection" just a little bit further. Such is the world of off-road racing: Just when you thought you had the rad car of the season, someone else comes along with a car that'll blow the doors off yours.

Back in the April '87 issue of *Car Action*, I reviewed a rip-snortin' 4WD off-roader driven by chains. It had a simple tranny layout with two gears and two chains, an aluminum chassis with rear motor mounting and a great gold color. The car was the AYK* Radiant, and that review showed that the Radiant was a car with real racing potential.

Now, two years later, the Radiant has developed into a car with even *more* racing potential: the new Pro Radiant. Not satisfied with a competitive car that had rear motor placement, the people at AYK and Race Prep* got together to make some big improvements on the already good Radiant. Let's take a tour of the chassis to see what has happened.

ASSEMBLY: After reading the instructions and examining the various parts, begin assembly with the transmissions. Not much has changed here; the same basic ball differentials are used inside the chain diff sprockets. These diffs are adjusted using an Allen wrench from the outside through the drive cup. The diffs have two sprockets (one with 16 teeth, the other with 15 teeth), and these sprockets are reversible, so allowing you to change gear-drive ratios; they can also allow for front-to-rear drive differential. The welcome addition of ball thrust bearings makes things easier to handle for the motor. Finally, large ball bearings support the sprock-

(Continued on page 67)

AYK RACING

PRO RADIANT 4WD

Type 4WD off-road
Scale 1/10
Sug. Retail Price \$259.95

DIMENSIONS:

Overall Length 14 inches
Width 9.75 inches
Height 5 inches
Wheelbase 10.25 inches
Front Track 8.75 inches
Rear Track 8.25 inches

WEIGHT:

Gross (w/bat.) 55 ounces

BODY:

Type Off-road buggy
Material Polycarbonate

CHASSIS:

Type Monocoque box
Material Composite fiberglass

DRIVE TRAIN:

Type (pri./sec.) Gear/chain
Differentials Ball type

SUSPENSION:

Front: Type Twin A-arms
Dampening Oil-filled
coil-over shocks
Rear: Type Lower A-arms,
upper rods
Dampening Oil-filled
coil-over shocks

WHEELS:

Front: Type Plastic
Dimensions (DxW) 2x1
inches
Rear: Type Plastic
Dimensions (DxW) 2x1.5
inches

TIRES:

Type (f/r) Pin-spike knobby

ELECTRICS:

Motor Not supplied
Battery Req'd 6- or 7-cell
Speed Controller Electronic, not
supplied

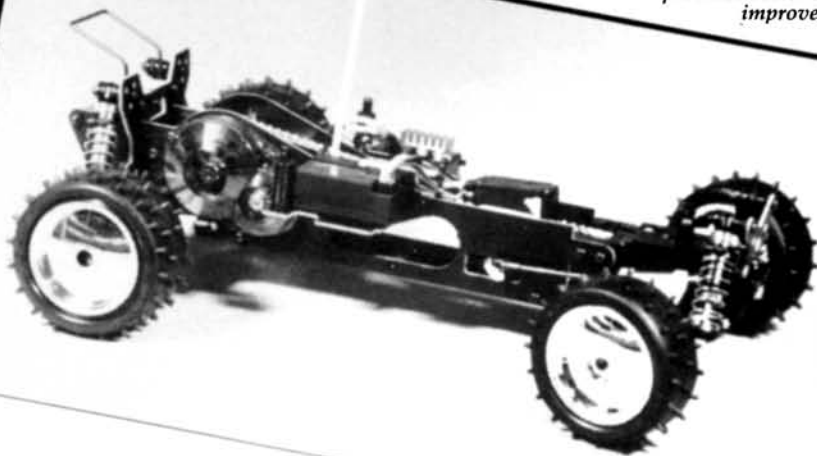
OPTIONS AS TESTED:

F&D Land Killer modified motor, Kyosho
500 speed controller, JR Alpina PCM Radio.

COMMENTS:

The Pro Radiant is much improved over the previous version. Better handling and balance improves cornering. The differentials are hard to adjust, and the mounting of the steering servo is poorly planned. Don't look to the instructions for size comparisons on hardware. The Pro Radiant has one of the best working shocks I've found in a kit. Overall, the Pro should be a competitive 4WD machine.

The Pro Radiant is much lighter and stronger than its earlier Radiant cousin. The mid-motor design provides better balance and improved handling.



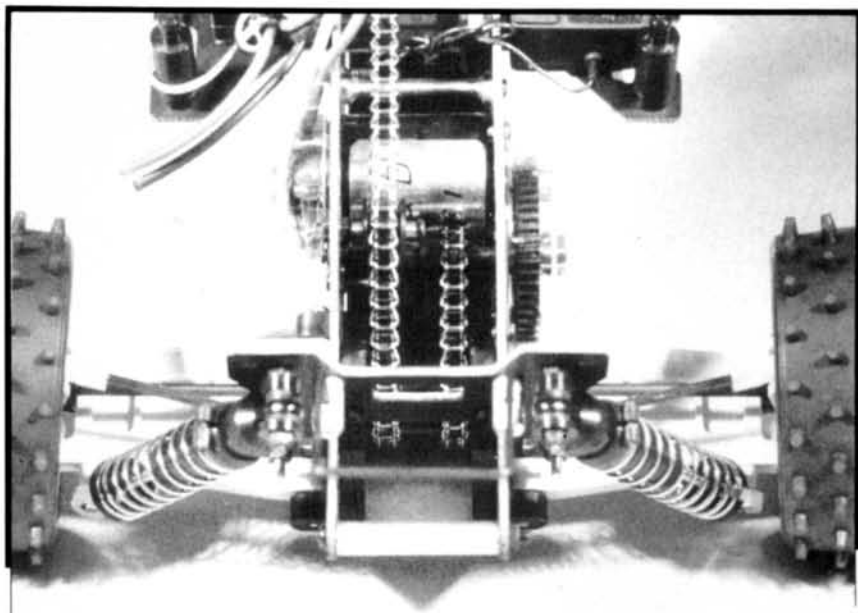
ets in the diff housings.

The front diff and housing are now mounted to the new composite chassis rails. The previous Radiant had gold anodized-aluminum side rails that looked like a million bucks, but a million bucks doesn't mean much if it costs you precious weight. The new, composite side rails are lighter and just as strong, if not stronger, than the previous units. When the front diff has been mounted, the rear comes aboard, along with a new chain idler pulley. This is quite welcome, as it will prevent the frequent bother of chain adjustment.

At this point, I want to make one thing clear: *Don't* use the little pictures to measure the size of the screws during assembly. They don't match well, and

you end up with total frustration. Instead, look very carefully at the exploded view of the assembly and go by that. Your chances of getting the right screw are much better.

Once the basic chassis rails are assembled, the suspension parts begin to fall into place. I noticed that the rear suspension now lies to the rear of the main chassis, rather than to the center as in the previous Radiant. This is, no doubt, a result of the mid-engine motor position. On the fiberglass shock mount, I found another useful addition: wing-mounting posts. (The older Radiant had the wing built into the body.) A large, rear, cage-



Top view of the Pro's rear end reveals the dual chain-drive system. This simple setup works very well.



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PRO RADIANT



This view shows the substantial rear-end guard. The supplied shocks are very good for stock units.

type bumper rounds out the tail group.

The motor and drive components are in the middle of the new Pro Radiant. As in the other Radiant model, the Pro uses the motor pinion gear, the spur gear, and then goes directly to the chains. A short drive chain connects the spur to the main drive chain, so that there are only three steps through which the power is transmitted before it hits the wheels. The lower the number of gears through which the power has to go, the more efficient it is, so this drive train is quite efficient. Just ahead of the motor, a new battery-tray mount for the 6- or 7-cell pack is bolted to the upper portion of the chassis, and this holds the battery with two cinch straps. Two body-mounting posts rest outboard on the battery tray.

The suspension system is next: I found twin A-arms holding the front together and a single A-arm at the rear. Although the front arms appear to have fixed caster, by turning them around on the mounts, you can adjust the caster. The suspension arms are well-serviced by chrome-plated suspension pins for superbly smooth movement of the arms. The same is true of the front spindles, where chrome ball joints allow really free movement to the steering.

To adjust the differentials, you have to remove the dogbones from the drive cups on both sides of the tranny and then adjust the setscrews. This is a trial-and-error session until you finally get the diff the way you want it. It's a pain in the neck to do this every time you need to

adjust your differential to suit the track conditions, but the diff doesn't readjust itself while running, so you might be able to run the car for a long time without readjusting.

The front end is finished off by the addition of the shocks, which are some of the best kit-supplied units I've ever used. I'm talking about some real dampening from out-of-the-box shocks—and without having to use an oil that's different from the one supplied in the kit! AYK has done its homework. The aluminum-bodied shocks have adjustment collars to change the spring length.

Since AYK provides ball bearings for the diffs and drive cups at the diff, you'd think that they'd also give you bearings for the axles at the wheels. I mean, this is the Pro Radiant. Well, sorry, folks, but AYK supplies only the standard plastic bushings instead. You'll need eight of the 5x10mm ball bearings to correct this, but at least you're given chrome ball screws to attach the shocks to the suspension arms.

At the rear, those superb shocks are mounted to the suspension arms. The rear camber is adjusted with oversize tie rods, and travel angle is adjusted with tie-rod mounting holes.

The last little problem is mounting the steering servo. The instructions recommend that you use only double-sided servo-mounting tape to keep the servo in place. Well, anyone who has played the rough-and-tumble game long enough knows that this tape won't last long in the dirt—at least, not for mere mortals

(Continued on page 150)

SHOCKING THE



STRIKER

Hopping-up your buggy's suspension

by TONY GULOTTA

IN MY LAST article, I showed you how to reinforce the chassis of Tamiya's* Striker and Sonic Fighter. (Some of you Falcon owners might benefit from this, too, since the bathtub-design chassis is the same.) The second part of this article is aimed at Striker owners who aren't happy with their cars' soft suspension. You Sonic Fighter owners are already set up with oil-dampened coil-overs all around, so go get something to eat, or read on!

OK, Striker fans, here we go! The Striker's rear suspension is a quick exchange for Tamiya's CVA short shocks. You build them and bolt them right on. I used the softer springs supplied with the kit, then I slipped the thin spacer onto the shock's body. (It really helped the rear

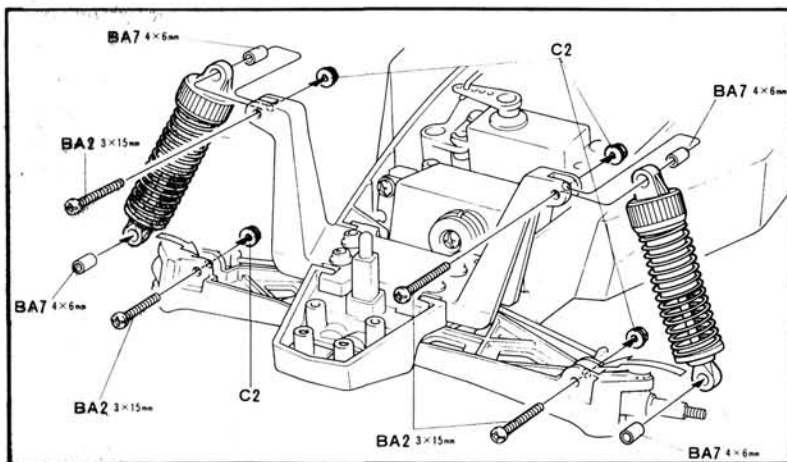
suspension greatly.) The front end requires a bit more work and some parts from Tamiya. If your chassis is already apart for reinforcing, why not take the extra few minutes to improve your car's handling? I tried bolt-on parts, but they leaked; the rods broke and were just not up to snuff. After three tries, I decided to do it the *right* way!

The "right" way for me was to order a set of F parts (No. X10163) and one Screw Bag A (No. X10168) for the Sonic Fighter. The F parts tree includes a pair of lower control arms and the upper shock mount, and the screw bag has all the mounting hardware you'll need. Save the lower control arms on the parts tree, since the ones on your Striker are exactly the same and are already set up. Remove the

Striker's original "dampers" and shock tower, and discard or save the four 3x12mm self-tapping screws that hold the tower in place. Install the new shock tower from the Sonic Fighter into your Striker and use four 3x15mm screws put in from the underside of the chassis. Secure them on top with four 3mm flange nuts. You now have taller shock towers that will accept a pair of Tamiya's Mini CVAs, and if you're going to use these, you can order a set (No. SP1332), or order the parts separately. I preferred the latter, because I then had some extra hardware for miscellaneous repairs. If you choose to do it this way, here's a list of what you'll need:

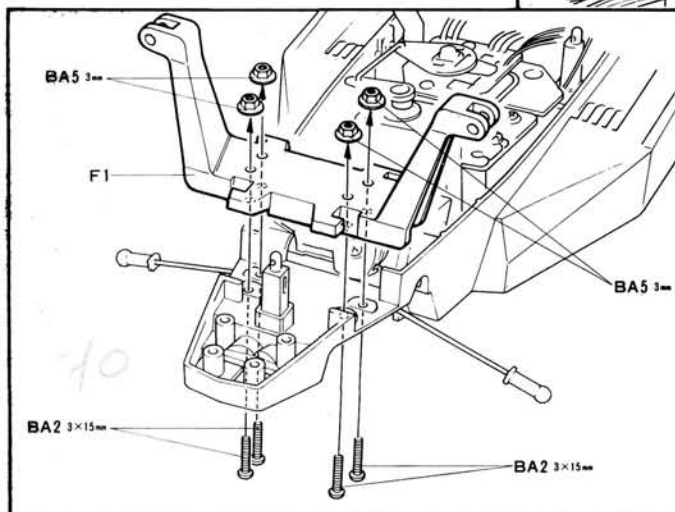
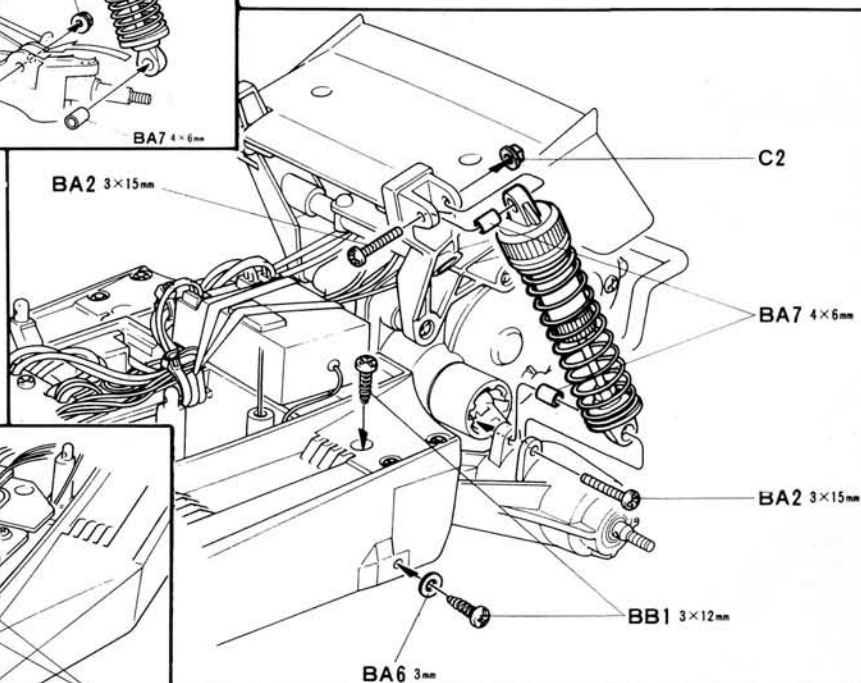
- Two W parts for the Sonic Fighter (NO.X10135). These are the Mini CVA body parts, and they include the shock

STRIKER FRONT END



Left: On the front end, the mini CVA shocks bolt onto the new shock tower and greatly improve handling.

Below: Tamiya's CVA short shocks bolt directly onto the Striker's rear suspension mounts.



Left: The new, front shock mount is found on the "F" parts tree from the Sonic Fighter.

body, top and bottom.

- One Damper Bag (No. X10166) in which you get the shafts for the front and rear shocks (use the short ones), the 3mm O-rings for the shafts and the oil seals for the top of the shocks (use the Gray Seals).
- One Screw Bag, C (No. X10170), which has the 2mm E-clips you'll need to lock the pistons on the shafts.
- One set of C parts for the Sonic Fighter (No. X10161). From this tree you'll need: C7; the three-hole shock-piston; C6; the mount that connects the shaft to the lower A-arms; and the C2 plastic nuts.
- One set of D parts (No. X10162) for the Sonic Fighter. This tree has the quick-change spring supports (D 13) which are really handy parts for fine-tuning your front end.

- One set of front coil springs for the Sonic Fighter (No. Y7101).
- Damper oil.

That's a pretty long shopping list, but when your bill comes to less than \$25 for what you need and some spare parts, too, it doesn't feel so bad. Remember, almost all the parts are interchangeable.

When you have all the parts, you can start by building the shocks and pistons. Using the short damper shafts, install an E-clip in the lower groove, slip on the piston (C7), then install a second E-clip in the top groove.

If you've built CVAs before, you know what to do, but I'll go through it anyway. Take the shock body (W1), and install the two 3mm O-rings at the bottom of it. Put some grease on the rings to prevent them

from sticking to the shaft and binding. Screw on the bottom of the shock (W3), then grease the damper shaft and slip it in from the top. Pull it down until it bottoms. Wrap a piece of cloth around a pair of long-nose pliers and grip the shaft. Thread on the lower shock mount (C6). Pour some oil into the shock and move it up and down to remove any air bubbles. When all the bubbles have been removed, pull the piston down, top off the cylinder and install the gray oil seal. Absorb the oil overflow with a piece of tissue, screw on the cylinder cap (W2), then slip on a coil spring. Pull back the coil and put on the "quickie" spring mount (D13). That's it!

Now you just have to mount the shocks

(Continued on page 154)

TROUBLESHOOTING

by FRED MURPHY

BRING IN THE PRODUCTION CLASS!



Production-class drivers are the lost backbone of racing. The future of R/C cars depends on their continued participation in our sport. Work with them and keep racing fun and economical.

WITH THE 1989 racing season upon us, I'll address a problem that many entry-level R/C car enthusiasts often face in all areas of the U.S. This problem concerns the lack of opportunity they have to take part in racing activities in their areas and at a national level, and our mail reflects their concern about this.

As a former local club president and race director, I understand their concern. Remember the days when production class was where all the activity was, and the big boys raced in stock class? The modified class was lucky if it had enough drivers and cars for just one heat. Those days are certainly long gone. When was the last time you saw Grasshoppers, Hornets, Monogram Lightnings, Nikko and Tyco cars out on the track thrashing for position? It seems that the people who work hard to get involved in R/C car racing with whatever resources they can put together are no longer able to compete, thanks to the big bucks at the top end of the sport. We all seem to overlook the fact that the entry-level market is where many

of us were introduced to R/C.

Even if you can't afford an RC10 or a top-of-the-line Kyosho car, you should still have a chance to be competitive in races. This might surprise many, but if it weren't for new R/C car enthusiasts, nobody would have a chance to race. They're the majority and they should have a chance to compete. After-school car nuts and weekend thrashers support their local hobby shops and aren't looking for sponsorship handouts, but just hoping to have some fun with friends without having to draw blood to do it.

Now don't get me wrong; this isn't the case everywhere, but many of the races I've seen during the last year or so didn't seem to attract as many new drivers as they once did. I can remember the time at our local club when, on any given Sunday afternoon, you'd see 80 cars—30 to 40 of them competing in the production class and the rest competing in the stock class with one or two modifieds on hand more for show than anything else. As of late, the modified class is the heavy class, and the production class is lucky if any-

one pays attention to the fact that they're on the track. What a shame! It's a shame because these drivers are the future of the clubs, and if the clubs don't take care of them, they'll lose members and so face extinction in the near future.

The R/C car market has expanded at a tremendous rate in the last couple of years, and it now offers everyone a chance to get involved in all the events that our full-scale counterparts offer, but the enthusiasm of spectators and participants must be nurtured. The entry-level car and driver are more important to this sport than any experienced driver with mega-buck equipment, so I'll offer some suggestions that might help the production class strengthen beginners' commitment to the sport.

First, even though the national ruling bodies don't address this class of racing directly, you can still be creative and make your own local rules following those set down by an organization like ROAR. There's probably some mention of the production class in ROAR rules, but you can tailor them to fit the needs of your members.

The main rule should concern motors. Since the most economical, true, production car motor is the Mabuchi 540, this should be the production-class motor. You could even consider something along the lines of a class motor like the new Speedworks motor from Trinity, but I strongly recommend that you stay with the Mabuchi, because it's economical and long-lasting. Once you go beyond that type of motor, you might as well call it the stock class.

Next, a more difficult decision: What types of cars should you allow in the production class? The primary determinant of this will be what shows up to race, but you should limit racers to the entry-level portion of the Tamiya line, the mass-merchandising-type cars from Tyco and Nikko and any other entry-level car that isn't a pure class destroyer.

The Tamiya Fox is an example of a class destroyer that comes standard with a Mabuchi 540. Even though the motor

(Continued on page 74)

PRECISION GEARS

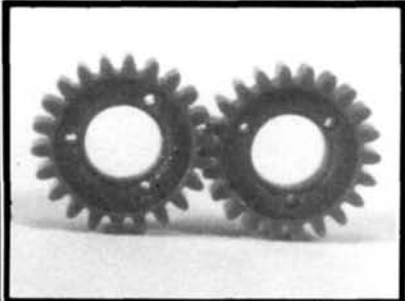
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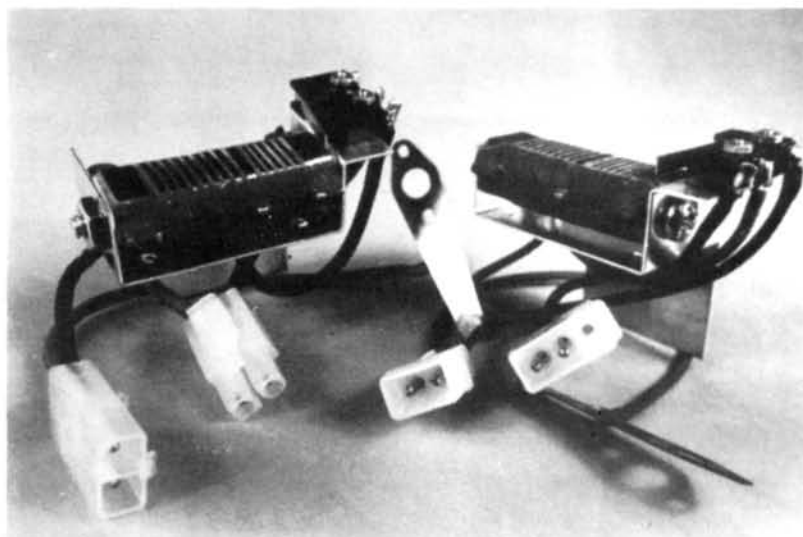
TROUBLESHOOTING

fits the class, it's obvious that the Fox was designed to go after the RC10, not the Hornet. Use a little common sense when deciding which cars to allow, and the competition in this class will be more exciting than the runaways you have in stock and modified.

Years ago, when I put the production class together at the local track, one of the biggest questions concerned parts replacement. Does the car have to use the OEM replacement component if it breaks or

skill and *not* on the size of your pocket-book. As a driver became more skillful, he naturally migrated to the stock and modified classes, where, with some experience under his belt, there was less chance that he would become frustrated.

Another key factor in production class is that drivers should be given a chance to be excited about returning to the track week after week. Just recognizing weekly performances by awarding finishing ribbons, or other inexpensive awards, will



Mechanical-type speed controls should be a production-class standard. They're heavy-duty, economical substitutes for the stock units found in most kits.

wears out? The answer was "no"; the replacement had to resemble the original part in design, but it didn't have to come from the original manufacturer. A good example was the speed control: One of the limitations was that a production-class car had to have a mechanical speed control, but if it wore out, a Tamiya three-step unit, for example, could be replaced with a Parma wiper-type unit. The key was that the unit should be *mechanical*—no *electronic* units were allowed in the production class. Once again, the primary concern was keeping the cost as low as possible for competitors.

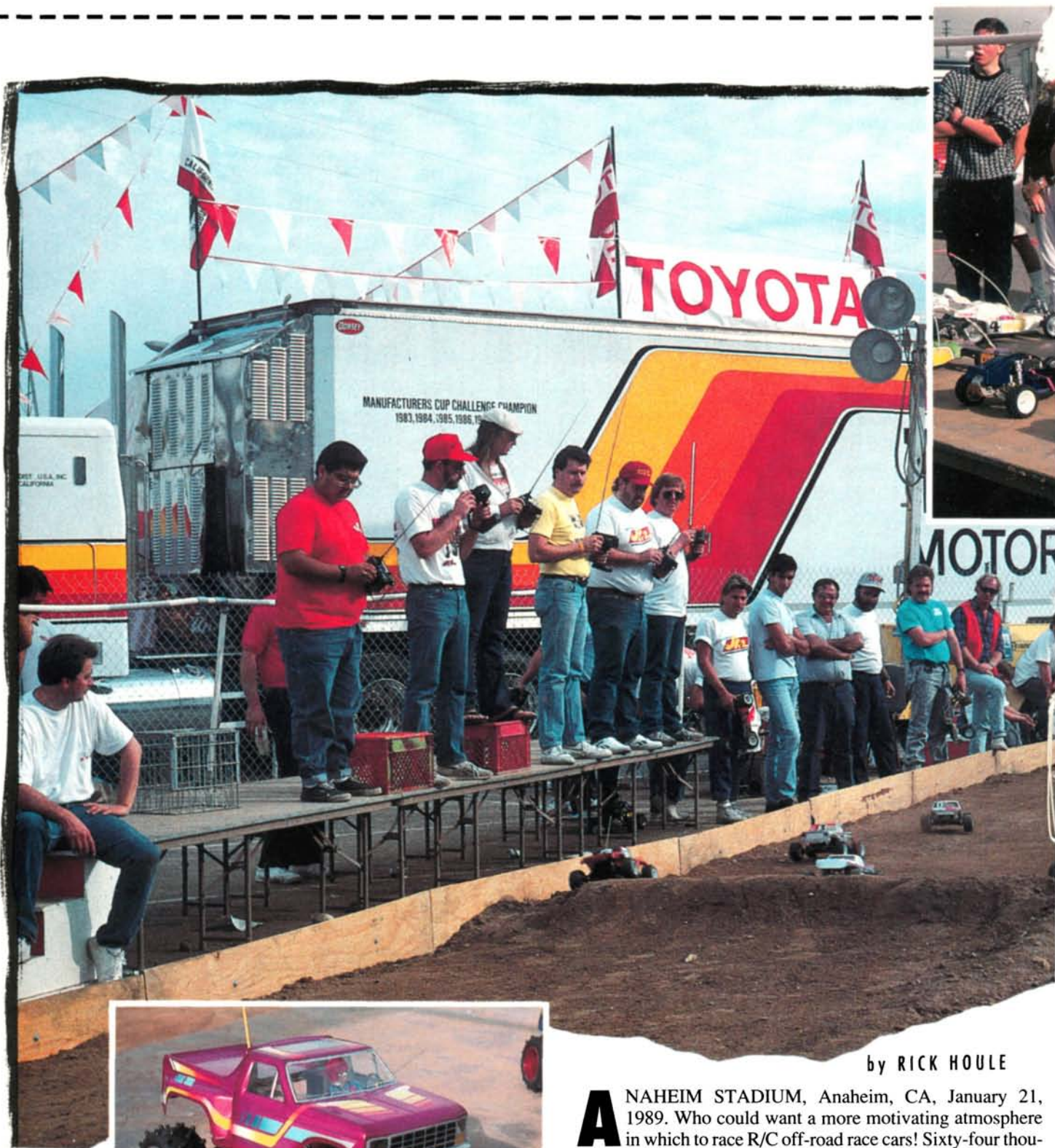
Apart from the motor and replacement-parts rules that were established, the only other production-class area that has been addressed is bearings. Bearings were allowed, but the rest of the car had to be in an out-of-the-box condition. This included the differentials; the car had to have its *original* gearbox and differential—no after-market modifications were allowed.

All these areas were easy to "tech-inspect," and they kept the production class competitive and reliant purely on driving

make members work hard race after race to improve their performances, because they get something out of racing besides a chance to watch the modified drivers take all the glory and big trophies. Keep this in mind if you want to keep your club alive.

You'll notice that production-class members *want* to get involved. In most cases, they'll be the first ones to pitch in and help with turn marshalling and track maintenance. All too often, the so-called big shots at the local tracks can't be bothered with anything other than working on their own cars, and they just can't seem to find the time to help the club's group efforts, but they're the first ones in line when it comes to the trophy handouts!

In the 1989 season, let's all work to get the production-class racers out to the races. Let's give them the chance to compete for the recognition that will reward their enthusiasm and so help keep R/C car racing alive. Without entry-level enthusiasts, our clubs will be *dormed*. Work with newcomers, and they'll support their clubs more than you'd ever expect. ■



by RICK HOULE



This Concours entry features TMS Racing aluminum wheels and tires with a sharply finished JG Ford F-150 body.

A NAHEIM STADIUM, Anaheim, CA, January 21, 1989. Who could want a more motivating atmosphere in which to race R/C off-road race cars! Sixty-four thousand screaming spectators watched as dirt warriors battled it out on the dirt of Anaheim Stadium, while in the parking lot, 215 R/C racers were fully involved in the same intense competition on a *scaled-down* version of the stadium's racecourse!

This was the first of a six-race series that promised us some of the most exciting R/C racing events to date. The Mickey Thompson series is the fruit of negotiations between NORRCA's President, J.R. Sitman, and the Mickey Thompson Entertainment Group (MTEG) about hosting R/C races in conjunction with full-size, stadium, off-road races scheduled to



Above: With all that open area on the truck bodies, the Lexan Leonardos were able to express themselves in a very colorful, graphic way, and this made judging even harder than usual.



be held at major stadiums throughout Southern California.

Accompanied by his wife, Peggy, the event's main sponsor, Revtech's Neil McCurdy, handed out Revtech goodies to all the racers as they brought their cars through tech.

The scaled-down racecourse was so treacherous that it presented a real challenge. Though the lanes were well-kept by the track's crew, the rocky infields spelled trouble for any driver who went off the course. Most of the racers agreed that this was a true

"driver's" track and a helluva lot of fun!

Everyone was treated to a sneak preview of things to come in the form of 1/4-scale, stadium, off-road race trucks, which were demonstrated by Jeff Schmidt (owner of QRS) and his son Jeffrey. These beauties are scaled-down Toyota trucks with forward-mounted gas engines, drive shafts and *live* axles! The course was too small for these babies to open up and *really* show what they've got, but everyone enjoyed their brief performances.

The relatively quiet screams of 1/10-scale electric race cars mingled with the throaty roars of exotic, full-size racing machines that fired up in the pits bordering the R/C track and charged off toward the stadium's gates to thrill the audibly impatient hordes of spectators waiting inside!

MICKY THOMPSON R/C STADIUM RACING

Thousands of curious onlookers crowded the fence surrounding the R/C track, and by day's end, some were loudly cheering—on drivers they'd chosen simply for their hot paint jobs or because they sported a spectator's favorite number—or whatever!

In the Concours judging, Hobie Kaptan's 1/10-scale version of Ivan "Iron Man" Stewart's Toyota truck, complete with on-board mini-cam, tools, spare, fire extinguisher, etc., took 1st place. Team Brake-A-Way's Roger Tibbets took 2nd with a JR-X2 painted like a bubblegum wrapper, and Rusty Price took 3rd.

The first round of qualifying kicked off a little before 10 a.m., and the last heat (there were 25!) before the Mains ended shortly after 5 p.m.

Tem Raskin TQ'd in 2W Open with 12 laps in 4:18 minutes (Mark Gray, Eddie Knoles Jr. and Tony Rossetti were the only other drivers in the class to go 12 laps!). Gray took TQ honors in



Hobie Kaptan's Concours-winning truck is a beautiful replica of Ivan Stewart's Toyota stadium racer. Chassis is a Tamiya Avante with a McAllister Toyota body.

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STADIUM RACING

(Continued from page 77)

4WD Open (12 laps in 4:04 minutes), and Tony O'Reilly and Derek Furutani also completed 12 laps.

In Open Monster Truck, Scott Scherburn went 11 laps in 4:02 minutes, Jeff Martin bested the field in qualifying in the Novice Class by posting 10/4:21, and Billy Bradford also went 10 laps. The 2WD Stock Class had the most entrants (57), and the times were extremely close. Ron Williams (12/4:22), Scott Scherburn (12/4:23) and Roger Tibbets (12/4:23) were the only drivers in the class who broke 11 laps!

In the new Super Stock Truck Class, Scott Roberts won the TQ hatpin with 11/4:14, and he was the *only* driver in this class to go 11 laps! Of the six entrants in the Stock Monster Truck Class, David Lord TQ'd with 9/4:04, Allec & Lane Manufacturing's own Daryl Lane took the pin in the 4WD Stock Class with 12/4:10, and Dominic Sellers posted 12/4:24.

Scott Quillen was awarded the "Appreciation Trophy" for his unselfish volunteering and help in making this event run as smoothly as possible.

Two-Wheel Open A-Main

At the starting buzzer, Tem Raskin took the holeshot with Beau Benninghoven chewing on his tail pipe! Tony Rossetti and Craig Lair were battling for 3rd when Mark Gray got past them both! Driving hard and fast, Benninghoven snuck past Raskin into the lead as Gray began to hunt Raskin down! At the halfway mark, Gray had moved into the 2nd slot and challenged Benninghoven for the lead. With less than a minute left, Gray sliced past Benninghoven on the inside just past the whoop-de-dos! With only *seconds* left, Gray fought off Benninghoven's charges until a mistake cost him the win. When the dust had settled, it was Benninghoven 1st, Gray 2nd and Raskin 3rd.

Four-Wheel Open A-Main

TQ Mark Gray grabbed the holeshot, but lost the lead to Tony O'Reilly early on. Tom Clark and Eddie McKay hashed it out for the 2nd slot while Jeff Benmoin practically pulled over and stopped to let the leaders go flying by unhindered. O'Reilly settled down into a comfortable lead with McKay in 2nd, while Clark and Tem Raskin fought it out for 3rd. O'Reilly cruised on to victory with McKay claiming 2nd and Raskin raking in 3rd.

(Continued on page 156)

RC10

TRANNNY TECH

by MIKE WINTER



Getting the most from the stock gearbox

EVERYBODY KNOWS HOW great and dependable the RC10 has been and continues to be, but the true key to winning races is good, safe driving and consistent maintenance of your R/C car. No matter where you race, you can bet there's always someone sitting there planning how to go a little faster, handle the turns a little better and, in short, *win* the race!

One of the main maintenance areas that should be discussed is your transmission, which plays a vital role in getting the power from the motor to the wheels and getting you across the finish line first. If your transmission has a slight bind in it or is too sloppy, too tight, or poorly lubri-

cated, you'll be losing vital horsepower that could have gone to the rear wheels. Smoothness and strength is the name of the game. The technical information provided and the companies featured in this article all address these problems, but, in the end, it's up to *you* to see that they're properly performed, installed and maintained for optimum results.

Miracle Speedway Racing Products* has developed the new Double Ball Bearing Diff Tube Support Kit with shims (No. 1007). It works very well with the Team Losi* Steel Ball Bearing Diff Tube, the Track Master* Diff Shaft, and Parma* 1420F Thrust Bearings, or just by itself!

The MSRP kit comes with six specially

sized shims, two precision ball bearings and a precision, machined, ball-bearing adapter. The bearings and adapter give optimum lateral support to the diff tube, thus minimizing diff-tube wobble and premature wear of the Teflon bushings—or bearings, if you use a ball-bearing diff tube. The kit also reduces the gear crawl of the right and left diff pinions and the differential spur gear, and it tightens the gear mesh.

The shims in the MSRP kit are used to reduce diff-shaft end play. By installing the shims properly and minimizing the end play, you'll be able to keep the diff pinions in nearly perfect alignment with the idler gears, and the ball-bearing

adapter "set" completely in the transmission housing. This is very important to ensure proper gear mesh and the overall strength of the transmission.

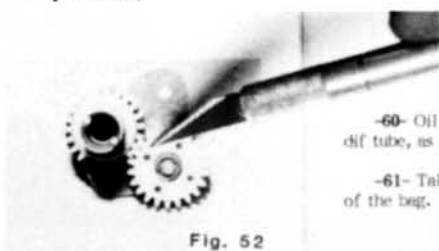
The Team Losi Steel Ball Bearing Diff Tube works very well with the MSRP kit; in fact, Miracle Speedway recommends it. The diff tube fits perfectly into the most popular racing gears, and the hub won't wear out and cause you to have a loose spur gear (the standard aluminum diff tubes often do). On the hub side, the ball bearing supplied in the diff tube replaces the Teflon bushing, which would come with standard tubes. This keeps the diff tube centered on the diff shaft and turning smoothly.



By filing the burs from the metal gears, you'll reduce premature wear of the nylon idler gears and ensure smoother operation.

Buy two packages of the Parma 1420F Thrust Bearings, which work very well as a replacement for the standard thrust bearing in your differential. By using two of the Parma bearings, you give each diff pinion a bearing of its own with which to work, so enabling your diff to work more smoothly and be more independent from the opposite side. This will help you stay in control of your car while you're powering out of the corners and down the straightaway. You'll install one thrust washer on the outside of each bearing and use your stock Associated* thrust washer (the one with the small hole) between the bearings. You can use the Parma thrust washers, but they're slightly thinner and you'll lose a little gear-mesh surface. Also, using a sharp hobby knife or razor

blade, you must trim off the Teflon bushing until it's flush with the side of the diff pinion. (This allows proper spacing of the diff pinions.)



By over-tightening the four screws that hold the bearing into the nylon idler gear, you may cause some distortion in the gear, which will result in binding.

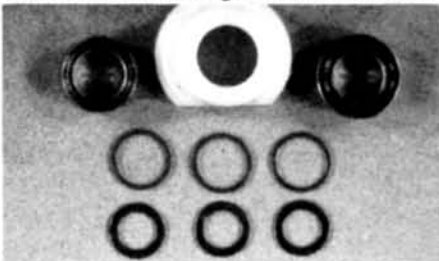
Track Master has come out with an RC10 long diff shaft (No. 4115), and if you're having trouble keeping your diff tight because the shaft is too short and the nylon on the diff nut won't lock up on the threads of the shaft, this will solve the problem. The long diff shaft also has an adjusting screw on the end to help remove diff-shaft end play. This works well with the MSRP kit, as it can remove any end play that might be left. The J.G.* A-12 Thin Diff Nuts can also be used in some cases, depending on how short your diff shaft is.

Shortness of the shaft is sometimes caused by improper installation of the left and right diff pinions onto the diff shaft and diff tube. Following Associated's instructions, they should be tapped into place with the wooden handle of a hammer or the plastic handle of a screwdriver.

Filing your gears can really help to reduce friction in your transmission, and to do this, you can use a fine, smooth-cut knife file, which can be bought at most hardware stores or through a local tool retailer. Run the file smoothly and evenly, once or twice, between all the teeth of your axle outdrive gears and diff pinions. This should be enough, although some worn and burred gears might require more filing.

To finish the gears, use some No. 600-grit, wet or dry sandpaper to polish them where you filed them. Place a piece of the sandpaper over the knife file and run it between all the teeth. Move the sandpaper after sanding each set of teeth to keep using a new area, as it will quickly become worn. Before you file *anything*, you should check the condition of each gear and replace them as needed. The axle-drive gears should be replaced if there are large notches worn in the slots where the dogbones ride, as worn slots will cause friction and premature dogbone breakage; smaller notches can be ground or filed evenly on both sides until smooth. The use of outdrive bearings is highly recommended on these gears, as they'll reduce friction and prevent the gears from becoming wobbly—especially when you have the hammer down! Associated*, Team Losi and other companies distribute these bearings.

One mistake that's often made while rebuilding or assembling a transmission is over-tightening the small button-head screws on the idler gears. In most cases



The Miracle Speedway diff kit includes bearings to reduce wear and shims to minimize crawling of the idler and drive gears, which results in misalignment and poor gear lash.

once you've done this, you can't get a gear to return to its original shape. The change is so slight that you can't see it, but you sure can *feel* it. As you rotate the drive gear, you'll notice that the idler gear more or less binds up as each over-tightened screw passes by the teeth on the axle outdrive gear. You can run your knife file through the teeth of the idler gears at these



tight points until they pass smoothly. (Use a marker pen to identify these points.) The idler gears should be checked for smoothness and signs of excessive wear. Associated will soon have a new style (No. 6614) Idler Gear available, but keep these tips in mind as they might be useful.

Your spine plates and pivots play a vital role in distributing the power equally to the wheels. If they're crooked or loose, one side of your diff will be tight, thus making your car pull to one side, especially while accelerating. The drive-gear pivot should always be locked firmly into place and have a small amount of thread-lock applied to its threads before the nut is tightened. The idler-gear pivot should be checked for looseness in the spine plate without the E-clip in place. If it feels loose, the spine plate should be replaced because it acts as a "shoulder" to the idler pivot.

To lube the transmission, paint the gear surfaces with Paragon* Liquid Bearings (No. 0025) and, when this Paragon has dried, oil the bearings and gears with Break Free (which is available from CRP*: No. 3501), because this great combination of Teflon and graphite works very well.

By addressing these areas, you'll have a stronger transmission that runs more smoothly and lasts longer. Remember, it's the *little* things you do that will make your car a winner!

**Here are the addresses of the companies mentioned in this article:*

Miracle Speedway Racing Products, 300 Pheasant Dr., Kalispell, MT 59901.

Team Losi, 1655 E. Mission Blvd., Pomona, CA 91766.

Track Master, 10450 Friars Rd., STE P, San Diego, CA 92120.

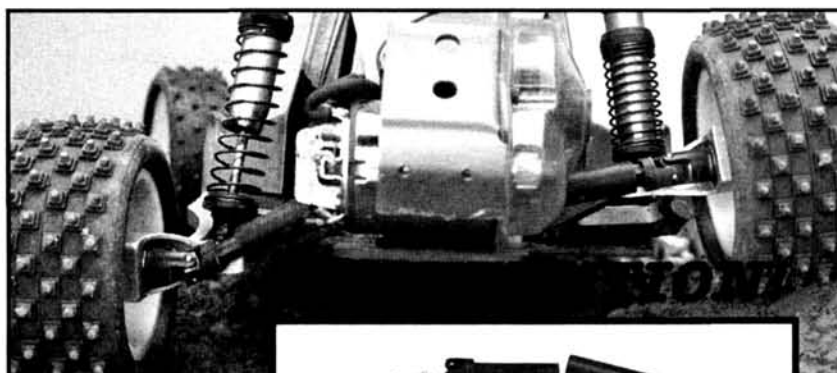
Parma International Inc., 13927 Progress Parkway, North Royalton, OH 44133.

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 90292.

J.G. Manufacturing, P.O. Box 6014, Whittier, CA 90609.

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BUDGET RACER

(Continued from page 21)

right side of the Raider (the left-side collars were set all the way up), the car de-

veloped a tilt with the left side lower than the right. This helped transfer some additional weight to the inside wheels which, on an oval car, carry the lightest load.

On the track, the car handled better, but

it still wasn't good enough: There still wasn't enough traction at the rear. Lowering the rear of the car would cause a further weight transfer to the back tires, so the lower rear shock-mounting points were moved outboard one hole. This dropped the back of the car about 1/2 inch, and traction improved even more. We were getting there, but hadn't arrived.

I checked the stagger between the two rear tires and found that I had the largest one on the left, instead of on the right where it belonged. Stagger is the difference in circumference between two tires. Visualize a car with a very large right rear tire and a small left rear. If both tires are turned at the same rate, the car will turn sharply to the left. This idea is used in sprinters to help the car turn left, and it works on our cars, too, but a little stagger is all that's needed. Since manufacturers of tires for our cars don't yet provide the same tire in various small incremental changes of circumference, we usually ignore stagger. In R/C oval-track racing, though, it's a good idea to determine which of two "identical" tires is the larger and then stick it on the outside. An easy way to check this is with a piece of string wrapped once around the outside of the tire. Mark it carefully, wrap it around the

(Continued on page 84)

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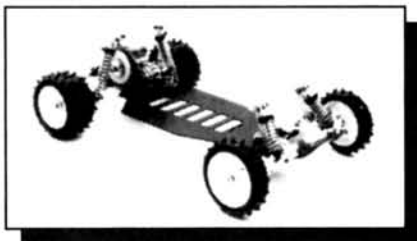
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BUDGET RACER

(Continued from page 82)

other tire and see which tire is larger.

Now it was time for the gear change and some final testing. I swapped the pinion for a 16-tooth, then a 17-tooth, and I finally settled on an 18-tooth (that's as big as the Raider would accept without some surgery on the motor-adjusting slot). Remember that I'd installed the 32-21 optional idler gear (which is provided in the kit), rather than the 36-21 called for in the instructions. Now the car was running the highest gear set (lowest ratio) available without the aforementioned surgery. With these changes, the Raider was running considerably faster than before, and its lack of rear traction was obvious. I had one idea left before having to settle for a tire change: aerodynamics.

I fitted the Raider with an Associated* wing (taken off an RC10) by drilling the holes deeper than the holes already provided in the top of the rear shock-mounting plate. Having a big, adjustable wing sticking out at the back made all the difference. The car was still "squirrely" up to about half speed, but when it was close to top speed, it settled down and ran some consistently fast laps.

(Continued on page 92)

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BANDIDO

TRACK REPORT

SHAKE N' BAKE
RACER IN A BOX

TO A FIRST-TIME buyer, assembling a basic R/C car can be a bewildering experience. When you've decided which car to buy, you still have to choose a suitable battery, charger and radio system. The huge array of products available provides a mind-boggling number of possible combinations. On top of all that, the car comes in about six zillion pieces, and a seemingly endless number of construction steps must be followed just to get it together.

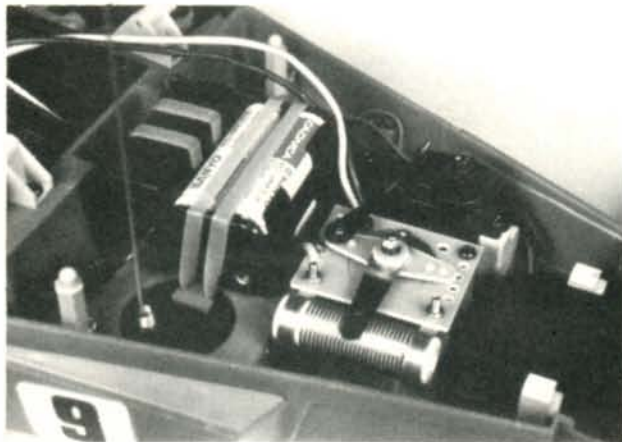
Mindful of this, the folk at Cox Hobbies* have an entry-level combo kit (Part No. 9084C) based around their 1/10-scale

Bandido dune buggy. This kit is complete with battery, charger and radio, and you'll only need a few simple tools, paint for the body, and 12 AA batteries for the radio to get you up and running. Cox even pre-assembles most of the car for you, and answers to any questions you might have when finishing the car can be obtained by calling their toll-free hot-line.

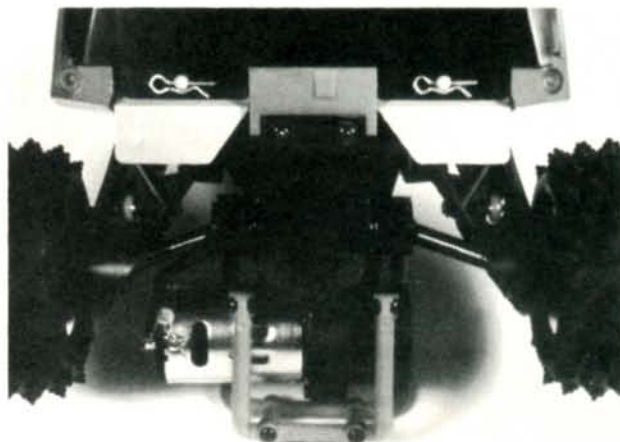
Long-time readers of *Car Action* may recall that Mike Lee reviewed the Bandido in the Winter '87 issue. Mike liked how it was easy to build, the simplicity of the differential gearbox, the toughness of the unibody chassis and the way it "can

take all the abuse you can throw at it." Mike concluded that it was a "great entry-level car" and one of the fastest RS-540-powered cars he had seen. Technology doesn't stand still, though, especially in R/C. Since Mike wrote that article, Cox has made several improvements to the Bandido. These include such things as incorporating an improved rear wing, clarifying some of the assembly and radio installation instructions, and including a better quick-charger in the combo kit. The really astute among you will recognize the Bandido's kinship to the Kyosho Pegasus/Icarus/Cosmo line of

by FRED L. BEAVER



The Bandido's tub chassis protects the internals from dirt or dust. The coil-wound speed controller will perform decently with the production 540 if it's cleaned periodically.



A trailing-arm-type rear suspension is used on the Bandido. Note the two body clips for easy access to the battery hatch.

cars—a kinship that ensures that the availability of replacement parts should be good for quite some time. It also means that any hop-up parts designed for these cars will fit the Bandido, too.

Made by Sanwa, the 2-channel radio system is the tried-and-true Cox Cadet (Part No. 8220B), which transmits on the 27MHz frequency and has easily changed crystals. The Cadet is a digital-proportional system that offers simultaneous control of the steering and throttle servos with its dual control sticks. While most drivers now use the newer pistol-grip-style radios, many have found it very easy to adapt to stick radios.



The Bandido comes with this 7.2V quick-charger, as well as the 7.2V battery and a twin-stick radio.

The power battery (Part No. 9086) is a Ni-Cd, 7.2V, 6-cell, 1200mAh flat pack, which is the industry standard. This battery will power the Bandido for around 8 to 15 minutes, depending on the terrain and how fast you drive it. The Cox quick-charger (Part No. 9088) is designed to run off a 12V power supply and has a plug to fit an automobile lighter socket. It has a 15-minute timer and a red indicator light to let you know when it's properly hooked up and charging.

Cox lists several optional parts that will make the Bandido go faster and handle better, and you can order these directly, or buy them at most hobby shops. The parts include ball bearings (12 are needed), front and rear oil-filled shocks and hotter motors. Remember that any

(Continued on page 164)

COX

BANDIDO

Type 2WD off-road
Scale 1/10
Sug. Retail Price \$219.90
(incl. radio)

DIMENSIONS:

Overall Length 15.3 inches
Width 9.1 inches
Height 5.1 inches
Wheelbase 10 inches
Front Track 7.4 inches
Rear Track 7.5 inches

WEIGHT:

Gross (w/bat.) 54 ounces

BODY:

Type Dune buggy
Material Polycarbonate

CHASSIS:

Type Molded tub
Material ABS plastic

DRIVE TRAIN:

Type Pinion/spur
Differential Planetary gear (nylon)
Bearings/bushings Plastic

SUSPENSION:

Front: Type Double wishbone
Dampening Coil-over friction
Rear: Type Trailing arm
Dampening Coil-over friction

WHEELS:

Front: Type 2-piece plastic
Dimensions (DxW) 2.8x.6 inches
Rear: Type 2-piece plastic
Dimensions (DxW) 3.2x1.6 inches

TIRES:

Front Rubber ribbed
Rear Rubber spiked

ELECTRICS:

Motor RS 540-S Mabuchi
Battery Req'd 6-cell flat
Speed Controller Coil-wound resistor

OPTIONS AS TESTED:

None.

COMMENTS:

Easy to assemble and maintain, the Cox Bandido is a very durable entry-level car for the novice. The combo kit has virtually everything the beginner needs to get started. Plastic suspension hinges have questionable merit, but seem to hold up fairly well.

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Pelican Enterprises DYNOTUNE

TAKE THE GUESSWORK OUT OF MOTOR TUNING

by WALLY DAVID



WITH RADIO-CONTROL car racing becoming more competitive all the time, racers need a way to evaluate their motors and batteries. While you can *try* listening to a motor to hear sound changes, this isn't a very effective way to tell if the motor is slower than at the last race.

It's important to have a way to verify whether that spring and brush change you made is going to pay off, and for that, you need a motor tester. The Dyno-Tune from Pelican Enterprises* is one of the latest entries in the motor-testing market.

SET-UP: When you open the Dyno-Tune's shipping container, you'll find a simple motor-testing device. A large ammeter in the center of the unit's face indicates the amp draw of the motor you're testing. To the right of the meter is the on/off switch, which should *always* be in the "off" position when you're hooking up a motor or your power source. To the left of the meter is a three-position switch that gives you a choice of low, high, or no load. At the bottom right front are two wires marked "Battery." There's no connector on the end of these wires, so you can use your favorite kind. I prefer the Race Prep* connectors with the gold-plated tongue-and-slot setup, because they make a very snug connection, and their small size allows them to fit quite well into tight places.

The instructions recommend that you use a freshly charged battery as a power source for the Dyno-Tune, but I think this makes a very uncontrollable test-bed, because the battery power will decrease as the motor is tested. For my power source, I used an adjustable-cur-

(Continued on page 90)

Comparing brush and spring combinations

TO ILLUSTRATE ONE of the uses of the Dyno-Tune motor tester, I took a Revtech stock motor and compared the volt and amp readings with different brush and spring combinations. For this test, I used Trinity hard, cut and timed brushes, and light, regular and heavy tension springs. I started with hard brushes and regular springs, taking both volt and amp readings under no load and under a heavy load. The test continued with the same procedure for the cut brushes and timed brushes. The accompanying charts list the combinations according to the voltmeter readings. The second column shows the amount of amps the motor draws, followed by the differences between the volts and amps. The first chart shows the rankings under no load, while the second chart shows them under heavy load.

BRUSH AND SPRING COMBINATIONS RANKED BY VOLT OUTPUT

NO LOAD

BRUSH	SPRING	VOLTS	AMPS	DIFF
1 Cut	Light	5.40	3.50	1.90
2 Timed	Light	5.10	3.50	1.60
3 Stock	Light	4.92	3.25	1.67
4 Timed	Regular	4.90	3.75	1.15
5 Cut	Regular	4.80	3.90	0.90
6 Cut	Heavy	4.50	4.00	0.50
7 Stock	Regular	4.32	4.00	0.32
8 Stock	Heavy	4.25	4.25	0.00
9 Timed	Heavy	4.17	4.00	0.17

HEAVY LOAD

BRUSH	SPRING	VOLTS	AMPS	DIFF
1 Cut	Light	3.97	4.00	-0.03
2 Timed	Light	3.75	4.00	-0.25
3 Stock	Light	3.73	4.00	-0.27
4 Timed	Regular	3.35	4.50	-1.15
5 Stock	Regular	3.25	5.00	-1.75
6 Cut	Regular	3.20	4.50	-1.30
7 Timed	Heavy	3.13	4.50	-1.37
8 Cut	Heavy	2.99	5.00	-2.01
9 Stock	Heavy	2.89	5.00	-2.11

VOLTS - AMPS = DIFFERENCE

On the Revtech stock motor, the cut brushes with light springs gave the best performance, giving the highest volt number and the largest difference between volts and amps. The timed brushes with light springs had the next-highest volt reading while drawing the same amount of amps. The stock brushes with light springs had a lower voltage output than the first two but drew less amps. This was the second-largest difference, making this combination slightly more efficient than the timed brushes with light springs.

The results under heavy load were almost the same: The top three wound up in the same order. While all the values dropped, the cut brushes with light springs combo was the most effective.

The aim of the test wasn't the formulation of a rule saying that a certain combo will *always* work with *every* motor. Another motor might work better with timed brushes and heavy springs. The purpose of the test was to give you a means of comparing and interpreting your results and information with which to decide the best combination for your particular motor.

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DYNO-TUNE

rent battery charger, which affords a constant output that removes one variable from the equation. Therefore, I installed the opposite connector to the one on my charger. You can use a battery if you want, but if you do, use a connector opposite to the one on your battery. Jacks on the left side allow you to hook up a digital voltmeter, which will give an output number that can be used as a reference during testing.

On top of the Dyno-Tune is a rail on which to mount two motors. On the left side of the rail, using one of the black motor straps provided, mount an older stock motor to be used as the load, or slave, motor. You'll have to supply a motor connector for the wires on the left side. On the right side, mount the motor that you want to test, connecting the red alligator clip to the positive tab on the motor and the black alligator clip to the negative tab. A piece of silicone fuel tubing is used to connect the two motors by their shafts.

At this point, you might be wondering why I've gone into so much detail on the Dyno-Tune's set-up. My reason is that the instructions are poorly written and, at times, misspelled. In the opening paragraph, the reader is thanked for purchasing a product built in the USA and told how proud the manufacturer is of the unit's workmanship. It would be nice to see a little workmanship put into the instructions! Pelican Enterprises isn't the only offender in this regard; many manufacturers *totally neglect* instructions. Consumers shouldn't have to *guess* what the instructions mean. When a product comes from the Far East and the instructions are translated into English, mistakes are understandable, but in the case of products made in the good old USA, those who write the instructions should have a decent command of their own language!

OPERATION: With both switches in the "off" position, plug your charger or battery into the Dyno-Tune. Before you connect the silicone tubing, adjust your charger to the proper output. Turn the current-adjust knob counterclockwise so that there's no current flowing, and set the timer for 15 minutes. Now turn on the Dyno-Tune and adjust the current knob on the charger until the voltmeter reads about 7 volts. This voltage was chosen because it's close to the voltage of a 6-cell battery under no load, and it allows the motor to turn without bogging down and, simultaneously, getting too hot. Make a mark on the face of the charger so you can return to that setting in the future. Switch the

Dyno-Tune off and connect the silicone tubing. Flip on the switch and observe the readings on the ammeter and voltmeter. The amps tell you how many amps your test motor is drawing. The load motor (your older motor on the left side) acts as a generator and gives the output reading on the voltmeter. You're aiming for a motor that will give the *lowest* amp reading while giving the *highest* volt reading. (This volt reading has only a relative value.)

The Dyno-Tune is a mixed blessing to racers who want to know how their motors are performing. On one hand, the applications of this equipment are endless. You can compare your motors with one another to tell which ones have the highest power output and which brush and spring combinations yield the best results. Different brands of lubricants and cleaners can be tested by timing the length of their effectiveness. In other words, time how long each brand seems to last. You can also test the capacity of your battery packs. Charge them and, one by one, time how long each battery lasts before it dumps (runs out of power). It's best to take meter readings every 30 seconds and then compare the results.

However, these useful applications are somewhat offset by the ammeter on the Dyno-Tune's face: The 0 to 10 scale is just too wide. I've never seen a properly functioning motor (or an improperly functioning motor, for that matter) draw more than 6 amps under these testing conditions, so a scale of 0 to 6 would be more helpful. As it is, there are no marks between each amp number, so it's impossible to make any precise measurements. A digital meter would be wonderful, but it might be too costly. The "High" and "Low" load settings don't seem to make too much of a difference to test results. Compared to readings taken *without* the two motors hooked together, the load created by the load motor is enough to tell how your motors will perform under load (see sidebar).

Overall, the Dyno-Tune is a useful tool for comparing motor performance. It's a convenient device that can be run off an adjustable-current battery charger, or off a battery pack when you're at the races. A more precise ammeter and more precise instructions would make this an even more convenient diagnostic tool.

*Here are the addresses of the companies mentioned in this article:

Pelican Enterprises, 2540 Ridge Rd., Lansing, IL 60438.

Race Prep, 20115 Nordhoff St., Chatsworth, CA 91311.

BUDGET RACER

(Continued from page 84)

To be competitive in the Production Class, the Raider must be able to turn laps

in the low 9s. With the new gearing and the stock motor, the car's best was in the 10s, which is a ton better than the high 14s it was running at the beginning, but it

still wasn't quite fast enough.

What's next for the Raider? I have a pair of the new Kyosho stock motors (the Super Stock 20 and the Super Stock 34), some DuraTrax* tires mounted on new, inexpensive, aluminum wheels, a change of rear shocks, and I'm looking for a sprinter body that will fit its chassis. To run in the Sprinter Class, the Raider will have to take on 1/2 pound, since the class minimum is 3.75 pounds, but that's OK, since I can hang the weight toward the rear, at the right where it's needed. Stay tuned!

See you at the track.

*Here are the addresses of the companies mentioned in this article:

Kyosho, distributed by Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.
Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

DuraTrax; distributed by Great Planes Model Distributors.

PANDA CYCLONE

(Continued from page 31)

with the collar facing out. There are no instructions about lubing the bushings, but don't forget to lube them lightly.

• Page 12, step 39: Don't mount the servo horn at this point. You'll have to

(Continued on page 94)

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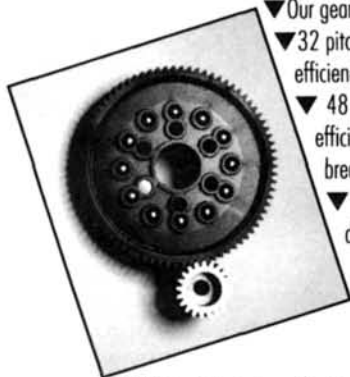
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PANDA CYCLONE

(Continued from page 92)

remove it in step 44.

● Page 12, step 42: There aren't any directions for connecting the battery connectors to the speed controller. The red connector goes on the side marked (+); the white connector goes on the side marked (-). Mount the red connector under the left, front screw that holds the speed controller onto the chassis. Attach the white connector to the hole at the left rear of the speed controller using a 3x4 machine screw and nut. See the next correction before doing this.

● The speed controller is installed backwards in the instruction manual. It's correct in the picture of the car on page 14, but not in the photo at the top of page 14. Mount the speed controller alongside the servo, not forward of it, or the wires connecting the motor will hang up on the servo arm.

● Page 13, step 45: The wires are yellow and green, not blue and red! The green goes in the center.

A few other aspects of this kit are worth considering. The motor comes with a press-fit pinion gear installed. I think it's tough to get the gear and the motor to

(Continued on page 120)

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Track Report

MRC

LUNCHBOX

by STEVE POND

SECOND
LOOK
SERIES

Photos by STEVE POND



THE LUNCH BOX, from MRC/Tamiya*, is the latest contribution to the wild world of monster trucks which are daily gaining popularity. The



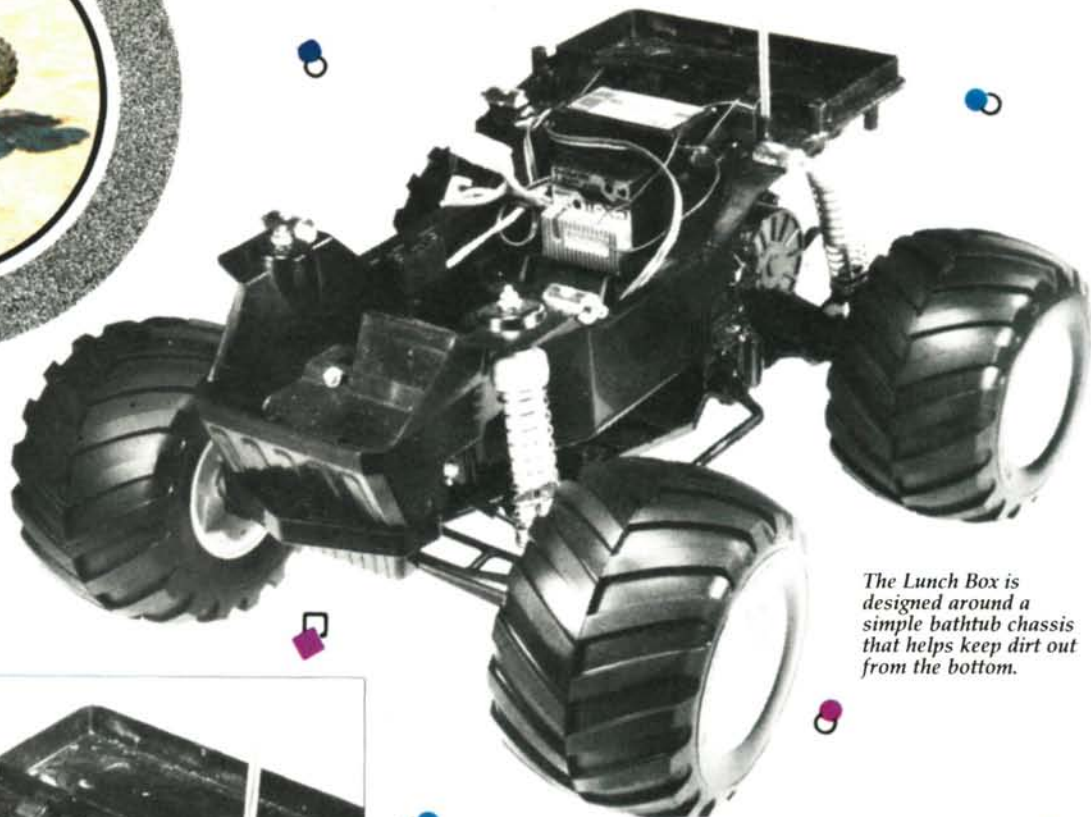
**A 1/12 SCALE
WHEELIE-POPPIN'
MONSTER MASHER!**



Lunch Box is not the stereotypical monster truck with a pick-up body, but a Dodge van body which has added a little diversity to a somewhat single-minded field of monster-makers. Although of the same breed as its other monster brethren, the nonconformity of the Lunch Box does not stop at the outer body. Instead of being one of the many making a bid to be the biggest on the block,

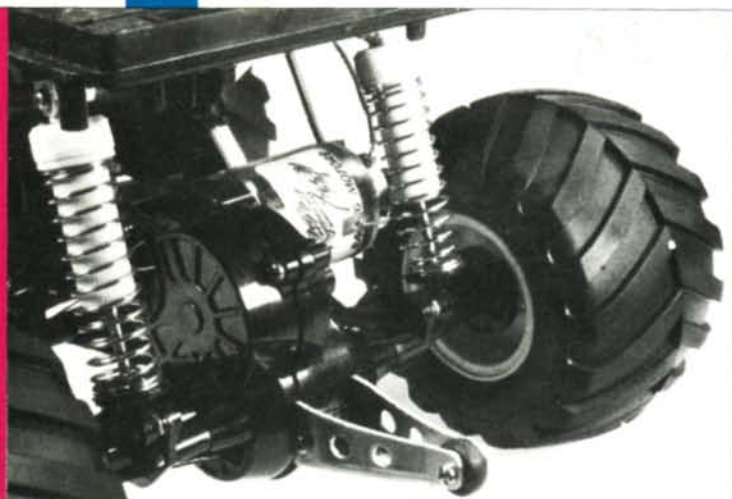
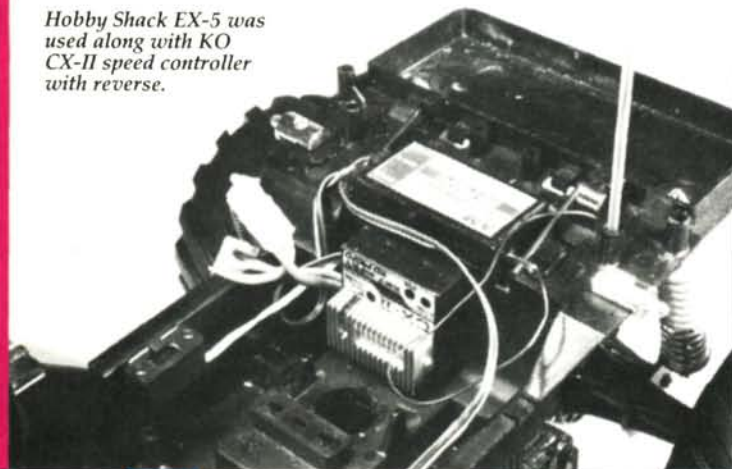
the 1/12-scale Lunch Box is one of the smallest monsters of its bloodline.

THE KIT: The Lunch Box borrows its chassis design from the 1/12-scale Mitsubishi Pajero, and you might recognize the front suspension and rear-end hardware (with the exception of the shocks) as that of the Hornet. This suspension is also standard equipment on the Pajero, although it's



The Lunch Box is designed around a simple bathtub chassis that helps keep dirt out from the bottom.

Hobby Shack EX-5 was used along with KO CX-II speed controller with reverse.



Race Prep stock motor (orange can) provided the Box with a bit more alacrity.

difficult to say which manufacturer gave birth to this versatile suspension arrangement. Nevertheless, the system works, and it would be an exercise in futility as well as a drain on the wallet if a completely new chassis were made for the Lunch Box. The features of the kit include a sturdy box-type chassis, coil-spring dampened front and rear suspension, a three-step forward and reverse speed control with a BEC connector plug, a Mabuchi 540-type motor, sealed gearbox with differential, 115mm diameter monster-type tires and, as with all other Tamiya kits, a very detailed body to round out the package. Other items needed to get the gears in motion are a two-channel radio system and a 7.2-volt flat battery pack.

ASSEMBLY: Prior to assembling the Lunch Box, gather the necessary tools as clearly outlined in the instruction manual. Once you have these tools and the required accessories, you are ready to begin assembly.

Begin with the installation of the radio system. Virtually any type of radio system will fit the Lunch Box, ranging from a standard system with a receiver battery, to a system with BEC or, in my case, the KO PROPO EX-5 with an electronic speed control. This radio system includes a KR-285A two-channel receiver, a PS-201S high-speed servo, and an RM-7 MOSFET electronic speed control with a built-in voltage regulator. This system might be overkill for the Lunch Box, but I've always emphasized superior performance, and this system really delivers.

Next in the construction process is the assembly and

LUNCH BOX UPDATE

by STEVE POND

THE LUNCH BOX is one of the newer trucks in the Tamiya monster line, but its roots go back as far as the Mitsubishi Pajero, which shares the same chassis, and even the Holiday Buggy (how many of you have heard of that one?), which used similar front suspension arms.

Although it borrowed parts from its progenitors, a good portion of the Lunch Box was completely redesigned before being manufactured. These borrowed parts had proven themselves durable and functional, but they faced a whole new set of rules in the then-new Lunch Box. Now that we've had the time to give the Box a thorough thrashing, we can give you an idea of how it could be improved.

Strictly in terms of monster-truck racing, with its virtually weightless front end, the Lunch Box is a handful to navigate. The chassis is designed for wild wheelie-popping action, but poor trackside manner is the result. The original Pajero was also designed to fly the front wheels high, but it was designed when radios still used receiver packs, and you could reposition the pack to keep the front wheels on the ground. Today's radios use BEC, so there's no receiver pack, but if you want better handling, you can add some ballast in the front.

On the flip side of the Lunch Box's poor handling is the

fun factor. If fun is your forte, then this ride's for you. With respectable speed, the Lunch Box can kick back and fly the front wheels high. Its terra tires enable the Lunch Box to navigate some rugged terrain, including sand, dirt, rocks and the thick, pile carpeting in your living room. In short, it's a blast.

So what does the Lunch Box need to keep it off the workbench? Not much! With the exception of the plastic bushings, few parts have suffered from consistent failure. One of the weaker areas is in the differential, which is similar to the diff used in the Hornet, and it might fall prey to the gremlins. Poor gear meshing is the main cause of a stripped diff, but this can be cured by shimmed the drive gears connected to the axles for a tighter fit. If you go top-side down, you might need to replace a body mount, and the stock speed control could cause you some trouble if you don't keep it clean. Other than that, this truck is a gas.

As one of the "not-so-old-and-still-goodies," the price of a Lunch Box is money well spent for the right buyer. The truck was never meant for racing, but it certainly was built for a beating in the course of some serious fun!

Installation of the rear end. This unit, as well as all other high-traction points on the Lunch Box, uses the plastic bushings that are standard equipment in all but a few Tamiya kits. These bushings are adequate for this application, but I've found that over a relatively short time, they wear to the point at which the tolerances inside the differential build up to such an extent that damage to the rear end might result. Fortunately, I had a war-torn Hornet sitting around with a set of optional MRC/Tamiya ball bearings that are interchangeable with the Lunch Box's because of similarities in the drive train.

Before you attach the rear end to the chassis box, the motor should be attached. Although the kit includes a 540-type motor, I decided to pick up a motor that would add a little spice to the menu. I chose the Race Prep Dyno Stock motor, as this gives a significant increase in performance while still allowing for a respectable run time. This, however, is all the motor I recommend for the Lunch Box. With a modified motor, the Lunch Box would spend more time on its roof than on its tires.

When the rear end has been attached to the chassis, install the shocks. In place of the friction-type shocks included in the Lunch Box kit, I chose a set of oil-dampened shocks, because I had a set of shocks handy from a previous Monster Beetle review, and I prefer them to the original equipment. Had these shocks not been readily available, I would have had no reservations about using the standard shocks, because they'll produce more-than-adequate dampening as long as they're well-maintained. The rest of the construction is straightforward, as it is with all Tamiya kits.

The body in my kit was of molded white plastic, so I chose to give it a nice lacquer job. I painted the body with an automotive

touch-up spray. These sprays are available in just about any color, so the choice is yours. Before applying the paint, apply a coat of primer, and, when the body has been primed, apply about seven coats of color, letting the paint dry between coats. The paint must then be hand-rubbed with compound to get a high-gloss finish. If this sounds like too much work, don't decide against it halfway through the job. Once you start painting, you must finish. When my paint job was complete, I applied the finishing touches and the Lunch Box was ready to take on all challengers.

PERFORMANCE: A quick bench-test assured me that the Lunch Box wasn't going to try to take on a tree before I got a chance to take a picture of it. After placing it on the street for its maiden run, I gave the throttle trigger a strong squeeze. To my surprise, the Lunch Box kicked back on its heels and dragged its tail (wheelie bar) for about 10 feet with the front wheels flying high. This came as something of a surprise, because I'd assumed that the wheelie bar was only there to prevent flipping off a rogue jump. After a few passes down the street, I realized that without the wheelie bar, the Lunch Box would be on its shell like a helpless tortoise. The next step was giving it some hard lefts and rights to see how it would handle with such a light front end. When the front wheels came down to earth and I was still on the throttle, the Lunch Box was able to make a turn, but not without some serious understeer. I placed an old receiver battery pack in the front end of the chassis, and this seemed to help keep the front wheels on the ground, as well as improve the handling, but I was having too much fun riding wheelies up and down the street to leave it there. After running the batteries down, I put the

(Continued on page 174)

SEE BUYER'S GUIDE NEXT PAGE

TAMIYA

LUNCH BOX

Type Off-road Monster Van
Scale 1/12
Sug. Retail Price \$135.95

DIMENSIONS:

Overall Length 14.25 inches
Width 11.25 inches
Height 9.25 inches
Wheelbase 8.25 inches
Front Track 8.5 inches
Rear Track 8.5 inches

WEIGHT:

Gross (w/bat.) 4 pounds, 7 ounces

BODY:

Type Dodge Van
Material Injection-molded plastic

CHASSIS:

Type Box
Material ABS plastic

DRIVE TRAIN:

Type Pinion/spur gear
Differential Bevel gear
Bearings/bushings Plastic

SUSPENSION:

Front: Type Independent swing axle
Dampening Coil spring
Rear: Type Rigid axle
Dampening Coil spring

WHEELS:

Type (f/r) One-piece plastic
Dimensions (DxW) (f/r) 1.9 x 2.5 inches

TIRES:

Type (f/r) Terra
Dimensions (DxW) (f/r) 2³/₄ x 4¹/₄ inches

ELECTRICS:

Motor RS-540S
Battery Req'd 6-cell flat, 7.2V, 1,200mAh
Speed Controller 3-step

OPTIONS AS TESTED:

Tamiya oil-filled shocks, Race Prep stock motor, and KO CXII electronic speed controller.

COMMENTS:

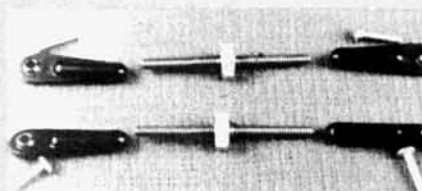
The small size of the Lunch Box makes it very quick off the line, but the light front end doesn't allow for very good cornering. Bearings for this truck are a must, as the stock plastic bushings wear out very quickly. The truck is otherwise very durable and doesn't require a great deal of maintenance. Overall (with the exception of off-road racing) the truck is a blast!

SECOND-LOOK SERIES BUYER'S GUIDE

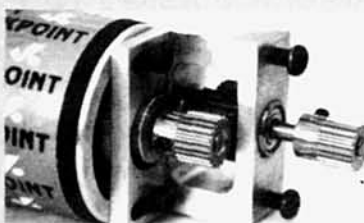
Nearly two years after its introduction, the Tamiya Lunch Box continues to be one of the most popular trucks in Tamiya's monster lineup, despite its smaller size. After-market parts manufacturers have enhanced the success story of the Lunch Box with a host of replacement and hop-up parts to improve some of its inherently weak areas. Here's a sample of some of the parts available.



Parma's new dual-wheel conversion kit for the Lunch Box/Midnight Pumpkin allows you to attach an extra set of stock tires and wheels, or after-market wheels with a similar mounting configuration.



Bolink's Adjust-A-Links are ideal replacements for the stock (and sometimes inadequate) steering linkage. The Adjust-A-Links allow for toe adjustment with a simple twist on the knurled collar without the need for disassembly.



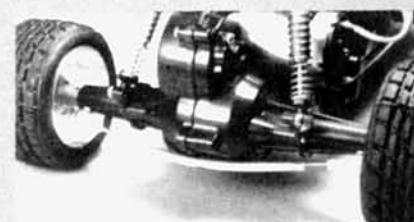
For truck-pulling applications, racing on short tracks, or simply when a change in gear ratio is necessary, Stormer Racing's 2-to-1 transmission is ideal. This transmission is designed for use with standard 48-pitch gears, so any number of gear combinations are possible to gear up or down.



To add a touch of class to your Lunch Box, TMS Racing now offers machined-aluminum wheels that are not only beautiful, but also run perfectly true, are light and exceptionally durable.



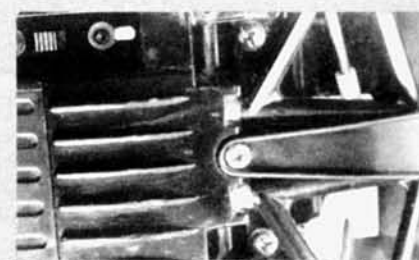
For wild monster-truck action, Imex offers replacement tires for the Lunch Box and Midnight Pumpkin that are similar to those used in full-scale sled-pulling and mud-boggin'.



To add a little rigidity to the axle housing of the Lunch Box, Miracle Speedway offers this brace kit (shown here on the Hornet), which will prevent the cases from splitting under heavy loads.



To improve the tolerances of the differential and prevent premature failure, Miracle Speedway offers this differential shim kit.



Miracle Speedway's front-end kit is designed to tighten-up the action of the front A-arms for more precise control and considerably less wear.

VON ERICH'S GARAGE

COMPOUNDS, PUSHES AND TWEAKS

by ERIC GOLDSCHRAFE

IF YOU'VE BEEN reading this publication for a while, you've probably come to the conclusion that all on-road cars are *not* created equal. For various reasons, all differ in one or two major features, but at a glance, most appear to be quite similar. We've found a couple that run like crazy right out of the box using the manufacturer's recommended setup, and others that had so many adjustments that they never seemed to be dialed-in. Most cars were pretty good, and just about all of them are capable of getting into the A-Main once they've been sorted out.

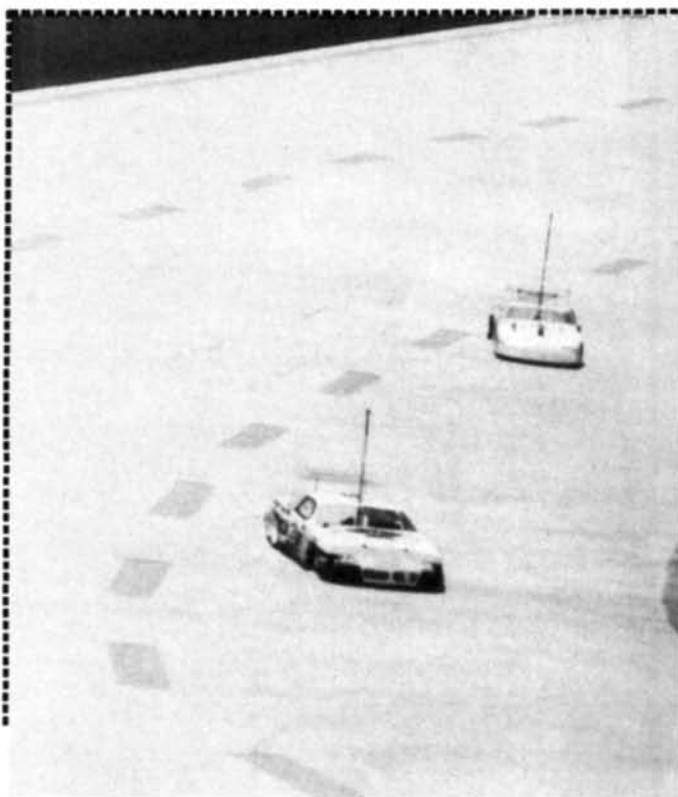
When you've started on-road racing and have reached the point where you can go around the track at a pretty good clip *without* testing the walls, you might begin to notice that you keep getting your doors blown off by cars that are *supposed* to be the same as yours. There's a reason for this, but the good news is that it *isn't* a secret. For a given track, there's probably one hot gear ratio that most racers use in the Stock Motor Class and a tire combination that seems to work for 90 percent of the cars. Assuming that you're running in a 6-cell, Stock Motor Class, when you've figured

out the gear and tire deal, you're ready to get serious about dialing-in your car.

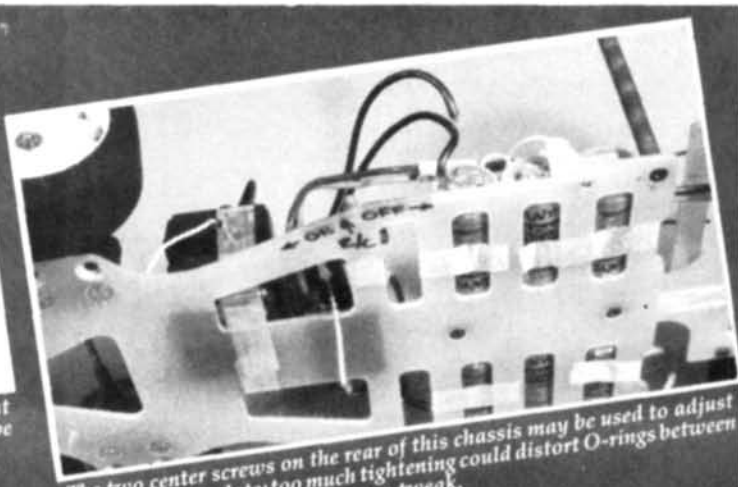
This month, I'll deal with chassis setup. The following guidelines should work for most 1/10-scale on-road cars. It shouldn't be too difficult to find out the best tire formula and gearing from the track manager or another racer. (While some make it out to be a big-deal secret, most will be glad to help you out.) Some motor manufacturers recommend that you use the highest gearing you can get away with and still have enough left in your battery pack to finish your race. I've found that this advice doesn't hold true for all motors and all racetracks, so experiment and see what works best for you.

Most car kits that include tires use blue compound front tires and green compound rears. Both TRC* and BoLINK* sell mounted and trued tires rated this way, and

they're used by most racers at our track. If the other racers at your track use a tire additive, figure on using it, too. Paragon*, Trinity*, Parma* and BoLINK are among the manufacturers of traction additives, but check the track regulations for approved brands. Your differential should also be adjusted correctly; see if you can get one of the "hot dogs" to check it for you. If he does make an adjustment, feel how tight it is so that you can get it back this way after you take it apart for cleaning or gear changes.



Shocks that won't leak! The Lazer Lite Shadow uses simple, but effective, dampers made from surgical tubing, which can be easily adjusted to tune the chassis.



The two center screws on the rear of this chassis may be used to adjust flexing of the T-plate; too much tightening could distort O-rings between the chassis and T-plate and cause tweak.



When you've armed your car with this basic ammunition, you're ready for action. If you don't have ball bearings on all axles, get them. Some companies claim a 30-percent improvement in performance with just the addition of ball bearings, and while I'm a little skeptical of that figure, I guarantee that they *will* make a difference. Sure, they're expensive, but you'll probably wear out a set of bushings and maybe some wheels and an axle before too long without them, and you'll then have to spend just as much on replacement parts—and

you *still* won't have the benefits of running ball bearings! If you take care of the ball bearings, they'll last a long time, especially if you race on carpeted tracks. Make sure everything operates freely and smoothly; if there are any tight spots or parts that bind, find out where the problem lies and fix it.

Next, make sure your chassis isn't "tweaked" (a condition caused by assembly mistakes or crash damage, where the chassis isn't perfectly flat). Place the car on a smooth, level surface, with the front end near the edge, then pick up the front end with the point of a hobby knife at the center line of the chassis. Spin the front wheels, slowly lower the chassis to the ground, and watch for the wheels to stop. If both stop at the same time, the chassis isn't tweaked; if one wheel stops before the other, the suspension must be adjusted to allow both to touch at the same time. The tweak causes handling problems because of the unequal loading of the tires on the track's surface. You'll have to find out how to get rid of the tweak (usually, you have to adjust one of the screws holding the T-plate or a spring or shock that isn't adjusted the same as the one on the opposite side), and set the car at neutral. Later on, when all the other adjustments are made, you can *intentionally* add tweak to further tune the chassis to certain tracks.

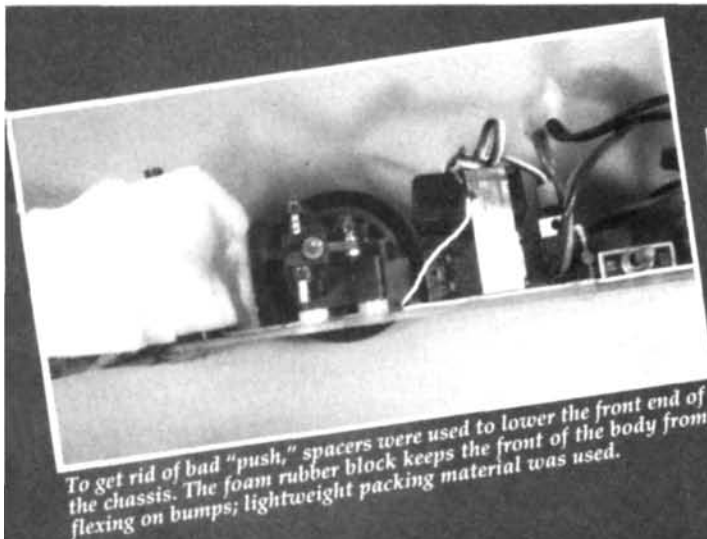
Now you can go back to the track for more tests. Run in practice heats with more experienced drivers and see where they gain an advantage over your car; while these hot dogs are lapping your car, notice

where you need improvement: going into a turn? coming off the corners? Make sure you're doing all you can in these areas, and try to develop a pattern. Does your car try to spin out in the corners if you drive it harder? If your car is this loose, some adjustment will be necessary. Ideally, the car should "push" a little in the turns (that's where the car doesn't turn as much as you turn the wheels).

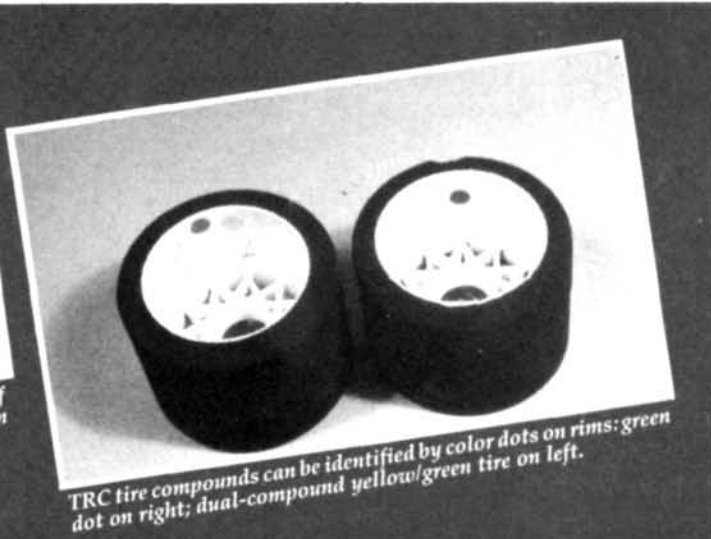
Push makes a car easier to drive, especially for beginners. When checking for poor handling, look at the relationship of the chassis to the ground: If the back end is higher than the front, or the front is higher than the rear, this could be contributing to the poor handling. You can change the ride height on some cars, but you might have to add some spacers between the motor/axle pod and the T-plate or chassis. Just go easy with all these changes, as a small change can have a large effect on your racer's handling. When changing the chassis' ride height, make sure that it won't bottom-out on corners or bumps, or you'll have your hands full. You need just enough push to make the car easy to drive through the turns, because the more you add, the more speed you scrub off, owing to tire friction as they slide sideways.

Watch your car again as it runs with the other cars. If the other cars pull away from yours going into a corner, you can take out some caster for a cleaner entry into the turn. Caster is the angle of the king pins from the vertical, and you usually need a couple of degrees tilt toward the rear end

(Continued on page 167)



To get rid of bad "push," spacers were used to lower the front end of the chassis. The foam rubber block keeps the front of the body from flexing on bumps; lightweight packing material was used.



TRC tire compounds can be identified by color dots on rims: green dot on right; dual-compound yellow/green tire on left.

THE NUMBERS GAME

by BOB GAGNE

ONE OF THE MOST frustrating things when detailing an R/C racer is finding the right number decals, whether for a Concours version of the famous "King Richard's 43," the local short-track hero's "7x," or for your own original design. Consider the problem solved and your frustration over, because this article will show you how you can create just the number design you need.

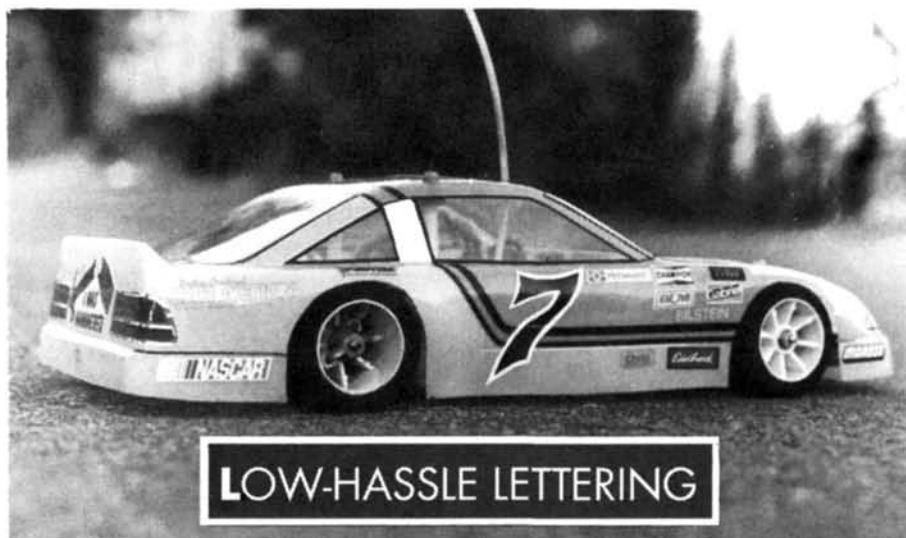
Before you start the project, decide the number, size and design style your car needs. If your racer is a copy of a NAS-CAR stocker, you'll need color photographs of the car so that you can match your materials to the actual color of that car. Photos will also help you to create exact copies of the original number design. Next, determine the amount of material you'll need. If you're detailing a 1/12-scale car, the size of the sheet of material needed isn't a problem, but if you're

working on a 1/4-scale car, you might have cause for concern.

When your car body is painted and fitted to the chassis, decide on the design of your masterpiece number, and collect the following materials:

- several sheets of Mylar colored film, e.g., Trim MonoKote
- a very sharp hobby knife
- a straightedge
- scissors
- a fine-point, felt-tip marker
- index cards
- a cutting board
- carbon paper

If you plan to create numbers with more than one digit, or a digit and some other symbol, you might also need silicone release paper (available at art supply stores) and wide masking tape. Once you have all your materials, you can get down to the business at hand.

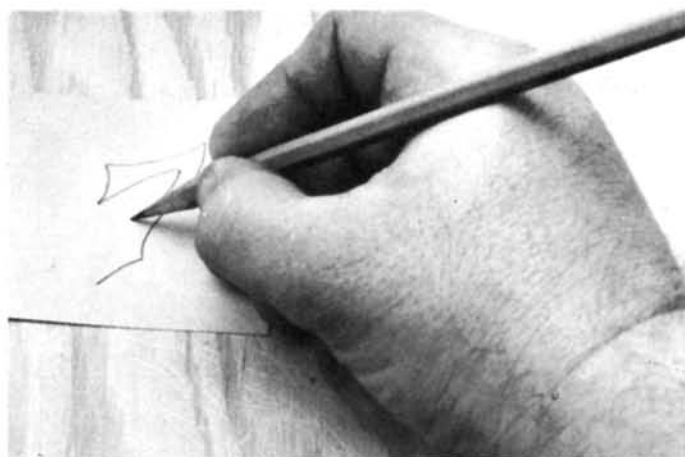


The first, and most important, step is to make the basic, one-color number. As a matter of fact, your needs might not go beyond this step! Start by drawing, tracing, or photocopying the exact design onto a piece of paper. There are several ways to do this. If you want a precise copy of a well-known racer, you might be able to get a clear picture of the number from a magazine article. If it's not the right size, you can use a photocopy machine to enlarge or reduce it to the correct size. If you're reproducing the numbers of your favorite local short-track car, photos of the car and driver might appear in the program, or a souvenir photograph might be available from the concession stand. If you're creating your own rad racer, you can draw your own design to scale on a piece of plain, white paper.

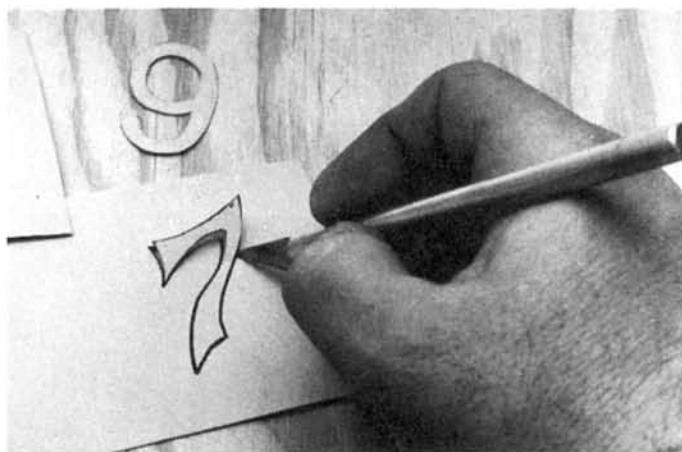
Next, create a template so you can duplicate every number you make. Re-



1. Materials needed: MonoKote Trim sheet (or something similar), sharp knife, straightedge, scissors, fine-point felt-tip marker, index cards, cutting board, carbon paper.



2. An outline of the letter or number is originated on template material so identical sizes and shapes can be achieved.



3. The figure is carefully cut out of the index card with a sharp hobby knife.



4. The template is used to make as many exact copies as needed on the trim sheet and can be saved for future use.

member, you're constructing the basic number first, so start with that part of the number that's central to the design. Using carbon paper, transfer that part of the design to an index card and check that the design has been transferred accurately. Now, cut out the template with a hobby knife. (A straightedge is very helpful when cutting straight lines.) Depending on the number and its design, it might be easier to use the part that was cut out as the template, rather than the shape that's left on the index card. A little experimentation will help to determine this.

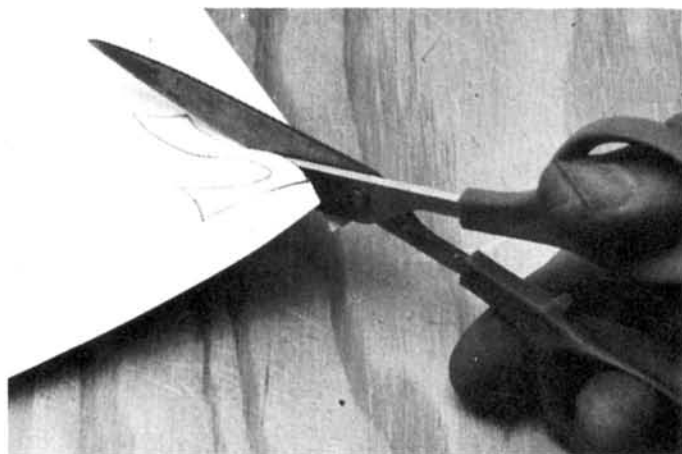
Now you're ready to transfer your design onto the Mylar film via the newly created template. Place the template in

reverse position (turned over so that it looks backwards) on the backing paper of the Mylar, and use the felt-tip marker to trace around the edge of the template. Again, check to make sure that the design has been transferred accurately. (Sometimes the template will shift a little as you trace the design.) The last step is to cut along the marks with a sharp hobby knife or scissors. Be consistent! As long as you cut your numbers the same way every time, it doesn't matter if you cut *on* the line or on the *inside* or the *outside* of the line. Consistency is important if you want your numbers to match. You now have a finished, basic number ready to be positioned on the car body, or to be used as

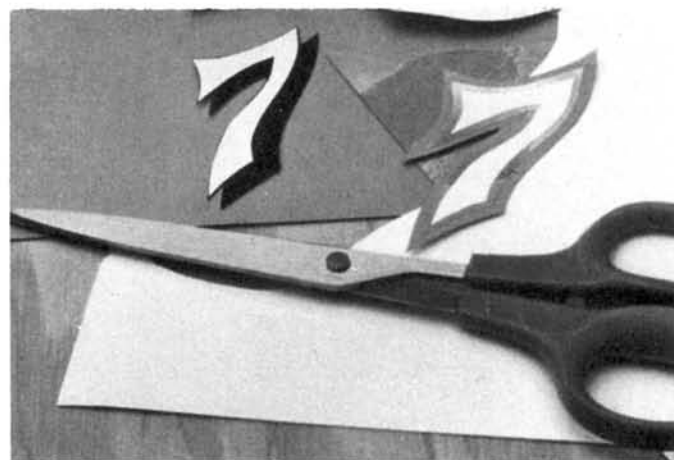
the basis for several special-effects numbers.

One type of special-effects number is the outlined number, which has a border around the outside edge of the basic number in a contrasting or complementary color. To do this, peel the backing paper off the basic number and stick it onto the contrasting colored Mylar to be used as a border, then cut around the number with a hobby knife or scissors, leaving a border of the desired width. If you're not sure how wide you want your outline, start cutting wider than what you think will be appropriate. You can always trim more off later, but you can't put it back!

(Continued on page 168)



5. The numbers are then cut from the trim sheet with scissors or with a hobby knife, if you have a steady hand.



6. The finished product can have multi-colored borders by laying the original number on another sheet of MonoKote of a contrasting or complementary color and then cutting the border to the desired width.

SCOPING OUT

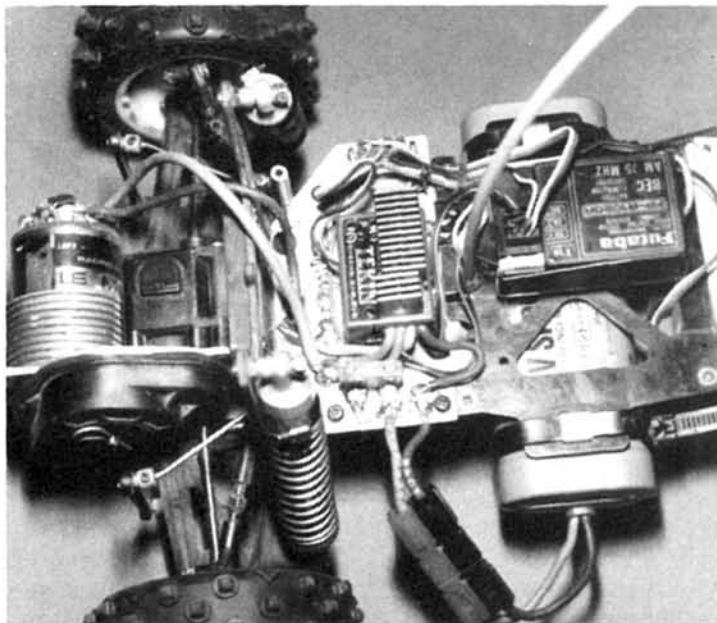
by JOHN RIST

Build Your Own Super BEC

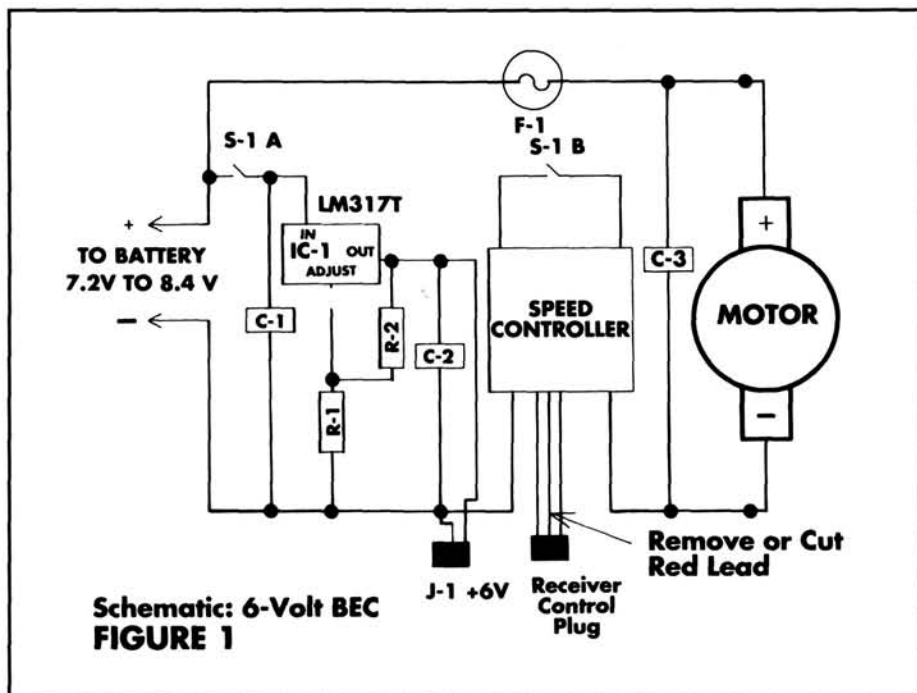
IN MY FIRST article, I pointed out that electronic racing speed controllers that lack reverse have much less voltage loss than standard electronic speed controllers that have forward, reverse and brakes. If your speed controller had as much as .015 ohm loss, it will rob your motor of .3 volt, which is an unacceptable loss for racing (3.6 percent from a 7-cell pack). In truth, because of the low voltages and high currents at which we run our racing motors, every component that adds resistance to our motor-control path robs the car of power. All the components in the control loop contain *some* resistance, so short wires are better than long wires; expensive, low-loss connectors are better than the original connectors; and good solder joints are better than connectors.

The other very common problem encountered when trying to set up the control system in a high-powered electric car is noise. I started racing with an Ultima in the 6-cell stock class using a Futaba* MC112B speed controller. The car ran straight and true with no hint of radio

glitching. I then set out to become competitive in the 7-cell modified class, and I installed a new set of Kyosho* Platinum



To overcome glitching problems caused by low voltage going to the receiver, the author designed his own super BEC for his Ultima.



shocks, a LeMans 360G motor and a Tekin* ESC 170P racing speed controller. My next trip to the track was a disaster: I suffered so many radio glitches caused by the high-powered motor that the car was uncontrollable. At this point, the electrical engineer in me took over, and I set out to find the cause of the glitching and to improve the car's performance.

I first added the standard set of capacitors recommended by the manufacturers of the speed controller. The car glitched less, but was still too jumpy to compete successfully against nine other noisy cars.

Next, I tried a separate battery source for the radio receiver. I did this by removing the center, red, lead from the connector of the cable that runs between the speed controller and the radio receiver, and adding a 4-cell AA alkaline pack to run the receiver. This setup provided instant success. The glitching was completely gone!

From this experiment, I deduced that the path for the motor noise to the receiver was through the BEC that was built into the speed controller, and that the noise

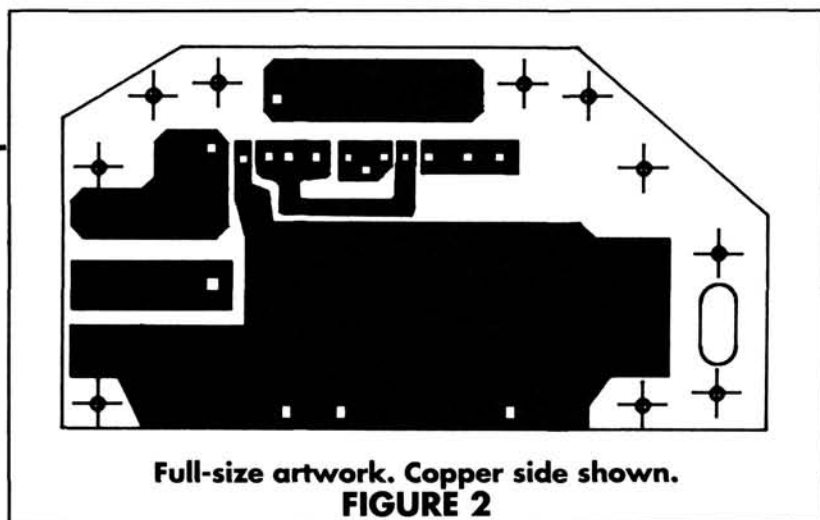
wasn't just radio frequency noise generated by the sparking of the motor brushes, but was probably also caused by voltage spikes caused by the large current surges that occur when an electric motor first starts to run. Armed with this information, I set out to design a mount for my speed control that would:

- keep all the high-current wiring as short as possible
- eliminate most, or all, of the connectors
- provide the 6 volts needed to run the receiver without using a separate receiver battery pack
- add as little weight as possible

This article describes how to build a printed-circuit board that acts as a mount for the speed controller and also provides a battery eliminating circuit (BEC) that has high noise immunity. The extra weight is negligible, because this printed-circuit board (PCB) replaces part of the radio plate, reduces the amount of wire and connectors needed and eliminates the separate receiver battery pack. Figure 1 gives a schematic of all of the parts that are mounted on this PCB.

The first step in this project is the removal of the radio plate from the Ultima's top deck, after which you saw off the back portion of the radio plate. Be careful to saw off the plate in the right place. The correct location is just aft of two of the mounting holes. To maintain the full strength of the chassis, two holes must be drilled in the chassis to mount the new section of radio plate. The full-size pattern (Figure 2) used in making the PCB should be used as a guide in cutting the radio plate.

The next step is etching the PCB. I used the Radio Shack printed-circuit kit (Cat. No. 276-1576; \$9.95) to make my PCB. The kit provides two blank boards (one is for practicing). In this article, I provide the full-size artwork used in making the PCB (Figure 2). Using carbon paper, trace the pattern onto the PCB. To finish etching the board, just follow the instructions provided in the kit. Care must be taken



when applying the ink pattern, because the better this looks, the better the finished board will look.

The final step in making the board is cutting the board to size and drilling all the holes. The holes used to mount the PCB into the chassis can be accurately located and sized by tracing the hole pattern from the original radio plate. The hole for the on/off switch is made by drilling a series of closely spaced holes and cutting out the material between them with an X-Acto knife. The holes for the small parts and wires should be drilled with a 1/16-inch drill or a smaller one.

Next, mount all the electrical parts (except the speed controller) on the just-finished PCB. The location of the parts can be seen in Figures 3 and 4. Remem-

ber to use rosin-core solder and a small-tip soldering iron of medium wattage. I used the Radio Shack 12V Iron (Cat. No. 64-2801; \$4.99). This iron is cheap and can be used to make repairs at the race-track. All the parts (except the fuse and switch) are mounted on the side opposite the copper. To mount the fuse, bend its legs 90 degrees and solder it to the copper side of the board. If your speed controller doesn't require a fuse, solder a heavy piece of wire in place of the fuse. Pay particular attention to the wiring of the switch. The switch comes from Radio Shack and is a double-pole, double-throw switch (Cat. No. 275-407; 89 cents). One of the poles is used to switch the BEC circuit on and off; the other is used in place of the switch that comes on the

PARTS LIST

NAME	LOCATION	CATALOG NUMBER	SOURCE
Printed-circuit	PCB	276-1576	Radio Shack
Voltage Regulator LM317T	IC-1	276-1778	Radio Shack
Capacitor 100uf 35V	C-1	272-1016	Radio Shack
Capacitor 1000uf 35V	C-2	272-1019	Radio Shack
Capacitor .1uf 50V	C-3	272-135	Radio Shack
Switch DPDT Submini	S-1, S-2	275-407	Radio Shack
Resistor 910 ohm 1/4 W	R-1		Local Electronics Parts Store
Resistor 240 ohm 1/4 W	R-2		Local Electronics Parts Store
Servo Connector	J-1	FPC-8M	Local Hobby Store
Optional Parts			
5-Minute Epoxy		DEV2000	Tower Hobbies
Soldering Iron, 12V		64-2105	Radio Shack
Solder		64-006	Radio Shack



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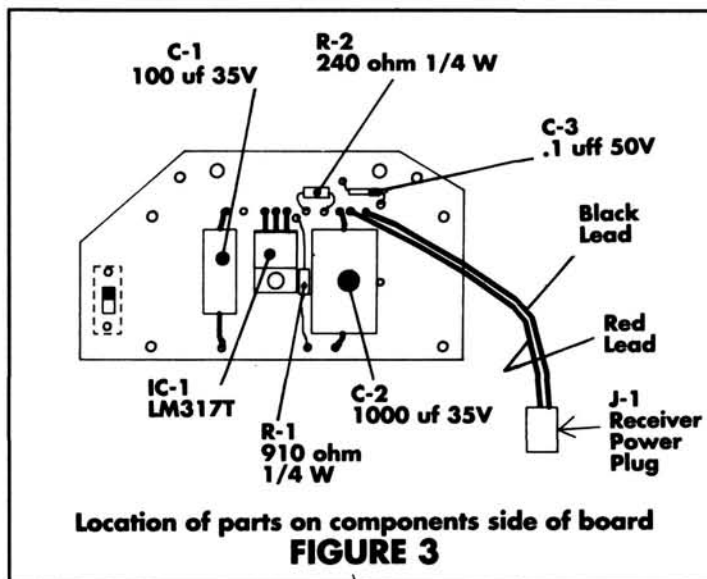
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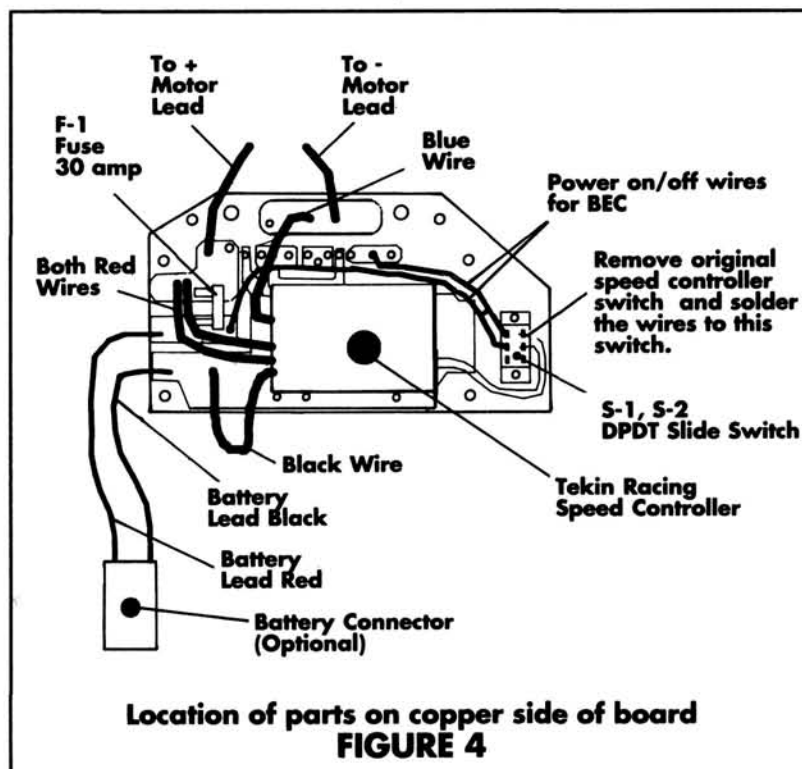
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Location of parts on components side of board
FIGURE 3



Location of parts on copper side of board
FIGURE 4

speed controller. With this switch arrangement, the fully charged battery can be installed in the car, and there will be no energy loss until the switch is turned on at the starting line. The cable and connector that provide the 6V power to the receiver are made from a Futaba servo replacement-lead kit, which can be obtained from your local hobby shop. It's necessary to remove the white wire from the assembly. This leaves the black wire, which is the ground lead, and the red wire, which is the 6V power lead. *Be very careful that you don't swap these two leads!* Not all receivers have reverse-voltage protection.

At this point, it's time to hook a charged battery pack to the PC board at the points marked "+ Battery (Red)" and "- Battery (Black)." You can solder-in the battery pack, but in my setup, I left the battery connector. By using a Litespeed* silver-plated connector, the loss is acceptable, and it eliminates the hassle of soldering-in a battery pack for every run. Make sure that the switch is on, and measure the BEC voltage at the receiver connector J-1. The voltage should measure between 5.8 and 6.2 volts. Take special note that the red lead is positive and that the black lead is negative.

(Continued on page 174)

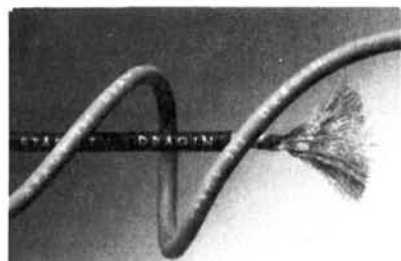
WHAT'S NEW



MCALLISTER RACING Chevy Lumina

The last of the new stock cars, the Chevy Lumina will make its appearance on the Winston Cup circuit in 1989. You can buy a 1/10-scale version today from McAllister Racing. McAllister Racing leads the way in scale racing trends again!

For more information, contact McAllister Racing, 2205 First St., Unit 107, Simi Valley, CA 93065.



STAGE III Dragin' Wire

Stage III "The Ultimate Cell Test" has expanded its product line again! The Dragin' Wire is designed for the huge current flow and high voltages typical in R/C powerboating, drag racing and truck pulling. This new 12.5-gauge wire has 33 percent more capacity than Stage III's state-of-the-art Super 13 wire, and has all the same quality and features: oxygen-free pure copper stranding; pre-tinned for fast soldering and corrosion resistance; 1,620 strands for super flexibility; and burn-proof silicone insulation. When only the best will do, Stage III is the only way to go! Dragin' Wire is available packaged with 2 feet of black and 2 feet of orange silicone-coated 12.5-gauge wire.

For more information, contact Stage III, 1189 Chicago Rd., Troy, MI 48083.



PRO-LINE The Terra Tamer

The Terra Tamer (Pro-Line No. 1035) is guaranteed to give your car added control in the dirt! Pro-Line's hot, new, pin-spiked front tire will fit stock RC10s and other cars with 1.9-inch front wheels. Look out for the Terra Tamer—this one's hard to beat!

For more information, contact Pro-Line, P.O. Box 456, Beaumont, CA 92223.



TEKIN Success at 75mHz

Tekin's new micro receiver has improved rejection of adjacent channels on 75mHz! This tiny (1.3x1.1x.5-inch) new receiver is the result of intensive research and testing by Tekin engineers and actually outperforms many larger receivers as well as other mini receivers. Now there is no need to avoid transmitters on a frequency next to yours, even if it's transmitting a stronger signal than you are. This micro receiver weighs only .45 ounce and features super-low operating voltage and special noise-rejection circuitry for ESC. It comes with FUT J plugs and may also be used with KO, Kyosho and Airtronics plugs, as well as with most brands of AM transmitters.

For more information, contact Tekin Electronics, 970 Negocio, San Clemente, CA 92672.



PANASONIC Rechargeable Battery

A Ni-Cd rechargeable battery pack—the RC-720—designed for the growing R/C car market, was introduced by the Battery Sales Division of the Panasonic Industrial Company. The new 1300mAh, 7.2V Panasonic RC-720 has a number of outstanding features that add up to a power source that's reliable and economical. It has a very strong discharge rate over a wide range of ambient temperatures and can be recharged up to 1,000 times. In addition, the new Panasonic product has "No Memory Effect," and it provides a full discharge, full charge every time.

For more information, contact Panasonic Industrial Company, Two Panasonic Way, Secaucus, NJ 07094.

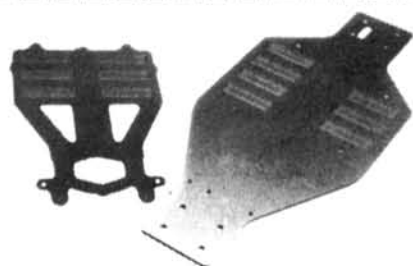


DU-BRO 2-56 and 4-40 Turnbuckles

Now there's no need to disconnect ball links to make front-end adjustments! Get the ultimate in handling performance by replacing your stock linkage with Du-Bro 2-56 and 4-40 turnbuckles and quality-built ball links. Precise toe-in, toe-out and camber adjustments can be made with ease, to get you back on the track fast. These 2-56 and 4-40 Turnbuckles are 2 5/8 inches long and can be cut to desired lengths.

For more information, contact Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, IL 60084.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.



MR. D.A. GRAPHITE D.A. Slot

The D.A. Slot is a unique cylindrical battery slot that won't cut battery shrink wrap (as standard milled slots will if they aren't refinished), and batteries won't short out with the graphite chassis. The D.A. Slot fits 1200 and 1700mAh cells perfectly. Another benefit of the D.A. Slot is the strength of the chassis in a downward load landing off jumps. The D.A. Slot won't cut all the way through the chassis, so the bottom layers remain intact to transfer load. The chassis can be manufactured to your designs using our graphite. D.A. Graphite material is solid, with either standard slots or the cylindrical D.A. Slot.

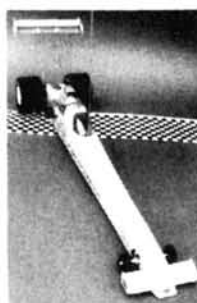
For more information, contact Mr. D.A. Graphite Products, 7953 Mission Bonita Dr., San Diego, CA 92120.



A.J.'S R/C The Challenger

A.J.'s R/C introduces the unbeatable truck-pulling weight sled. The Challenger's all-metal construction has a capacity of more than 150 pounds. Designed for 1/10- and 1/12-scale monster trucks or any other sled-pulling vehicles, the sled features dual heavy-duty wheels, sealed bearings on the axle, and a gold and black anodized finish. The Challenger comes fully assembled, weighs 12 pounds, and satisfaction is guaranteed.

For more information, contact A.J.'s R/C, 2102 Guilderland Ave., Schenectady, NY 12306.



CRAIG MODEL CR-1

To complement the widely popular SR-1, Craig Model Company introduces the CR-1. Shown here is a model of the first full-size Eddie Hill dragster that was the first top-fuel car to break into the 4-second bracket. The body is 1/10-scale and is made of .040-thick Lexan before forming. It's furnished untrimmed and unpainted for \$24.95. This body will accept the same chassis as Craig Models streamlined SR-1 with only slight modifications and a spindle change.

For more information, contact Craig Model Company, 19515 F.M. 149, Box 142, Houston, TX 77070.



COMPETITION R/C CARS Drag Race Fever

The Holeshoot cars from Competition R/C Cars offer a fast, simple alternative to complicated, expensive drag-racing machines. Manufactured to exacting specifications from the highest quality materials, these machines are ideal for the hobbyist and pro racers alike. The product line includes 1/12-scale top-fuel dragsters and funny cars, as well as scratch-building components for the advanced enthusiast; 1/10-scale versions are planned for the near future.

For more information, contact Competition R/C Cars, 111 21st Ave. W., Bradenton, FL 34205.



PARAGON RACING Stock Motors

Paragon now offers a super stock motor! Following in the tradition of other fine products from Paragon, this motor is right at home! Each unit is carefully tested and broken in. Featuring a new 27-turn wind, this motor has been taking top honors at many regional events.

For more information, contact Paragon Racing Products, Dept. CA2, 8802 Knollwood Dr., Eden Prairie, MN 55347.



AMSOIL Synthetic Lubricants

Amsoil Synthetic Two-Cycle Oils are superior-quality lubricants that provide maximum protection and outstanding performance in virtually all 2-cycle engines. Amsoil 100:1 Two-Cycle Oil is formulated for pre-mixing with gasoline at a fuel/oil mix ratio of 100:1. Amsoil Two-Cycle Injector Oil is formulated for use in injector-type 2-cycle engines. Both are made with the finest chemical base stocks and high-performance additives, resulting in excellent performance capabilities not normally attainable with conventional petroleum 2-cycle oils, so ensuring long engine life and trouble-free operation.

For more information, contact Amsoil Dealer Associates, P.O. Box 6664, Stockton, CA 95206.

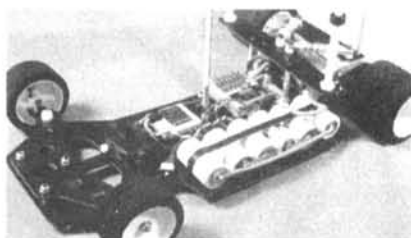
WHAT'S NEW



MAXELL Battery Handbook

To help improve consumers' understanding of the incredible variety of battery technologies available today, Maxell Corporation of America, which markets one of the most extensive battery lines in the world, has introduced the first consumer handbook. The Maxell Battery Handbook, an 8-paneled warehouse of knowledge, offers information on various battery formats to power all the consumer's needs, from toys and radios to laptop computers and camcorders. The handbook supplies answers to the most commonly asked questions about batteries and includes important safety tips to ensure proper usage so consumers get the most out of their batteries.

For more information, contact Maxell Corporation of America, 22-08 Route 208, Fairlawn, NJ 07410.



BOLINK Eliminator L.T.O. Chassis

This graphite chassis for the Eliminator 10 has mounts for all six batteries on the left side of the chassis, for oval racing (left turn only). All standard Eliminator-10 parts fit.

For more information, contact BoLINK R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.



GREAT PLANES DuraTrax Competition Shocks

Brand-new DuraTrax Competition Long and Short Shock Absorbers are quality-manufactured in Japan and are designed to give driving performance a boost at a price that's hard to beat. In addition to a great-looking, gold-anodized shock body, these shocks include ball ends and a silicone O-ring with a non-stick guide to prevent leakage. DuraTrax Competition Shocks come in short (3-inch) and long (4-inch) lengths to suit a variety of driving applications. They're easy to use: just add oil. Replacement parts are readily available.

For more information, contact Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.



TMS PRODUCTS Aluminum Wheels

Now available for 1/12-scale cars are these spoke-design wheels from TMS Products that fit the RC12i, RC12L, and others. Made of high-grade aircraft aluminum and designed for strength and trueness, these wheels are quite lightweight for the racer. An adapter is included in the set of rear wheels, so the wheel no longer has bolts to spoil the clean line.

For more information, contact TMS Products, 11948-A Del Amo Blvd., Torrance, CA 90501.



COMPUTIME Discovery Program

There's a new and exciting program for younger R/C enthusiasts (or beginners), ages 9 to 16 at Camp Rockmont for Boys in the mountains of western North Carolina, near Asheville. The camp will again offer a unique R/C Program as part of its CompuTime Discovery Program, now in its seventh season. The R/C Program began last summer, and met with resounding success. The courses offered in 1989 include: the fundamentals of R/C kit building, in which the camper will build, race, and take home a completed R/C car or truck combo including radio, charger and battery packs; an entry-level introduction to R/C called Everything R/C, which will feature hands-on experience with 1/10-scale off-road cars, trucks, boats, and even some more exotic airborne equipment such as hot-air balloons and gliders (this course will also acquaint the camper with some of the different types of R/C equipment on the market, and familiarize them with battery charging, and basic maintenance). R/C Racing will give the camper ample time to practice his skills on the two off-road dirt tracks and the rough terrain monster truck track. The camp is residential, offering two-week, four-week, or all-summer sessions beginning June 14 through August 12. The camp features a full range of activities, including tennis, basketball, sailing, water skiing, horseback riding, white-water canoeing, rock climbing and many others. The CompuTime Discovery Program also offers fun and challenging courses in electronics, computers, robotics, and science.

For further information, contact Karen Bonnell, c/o CompuTime, P.O. Box 567, Naples, FL 33940-0567.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by Radio Control Car Action, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in Radio Control Car Action.

PANDA CYCLONE

(Continued from page 94)

wear out at the same time, but at least the builder can be certain the pinion gear has the correct spacing.

The counter gear is somewhat narrow; in fact, it's narrower than the motor pinion. This may decrease its life expectancy, because it's very easy to go from forward to reverse, and drivers will be tempted to abuse this feature. (The manu-

facturer cautions against this unless the car is stopped first.)

It's very difficult to get the ball links to snap onto the ball connectors. The ball connectors are held in place with screws that go all the way through them. This precludes using a pliers to snap the connectors on. You have to use finger pressure and it takes a lot. This isn't a good design for youngsters building their first car.

By now you're probably thinking the Cyclone is a dog. It isn't. In spite of the poor instructions, the Cyclone is as good as any solid-axle car as I've seen. All the fat has been trimmed off (it weighs only 3 pounds, 2 ounces with battery) and it accelerates like a rocket.

What bothers me is that manufacturers are still making (and importers are still importing) a design based on Tamiya's Grasshopper. This basic design is easy to manufacture, but it isn't a good-handling, true, off-road setup.

Although I prefer fully independent front-and-rear suspension off-road cars, the Panda Cyclone is a good, solid-axle car that's a good starting point for young R/C enthusiasts. The brass oilite bushings are a definite cut above the plastic bushings found in most kits. If beginners can

(Continued on page 122)



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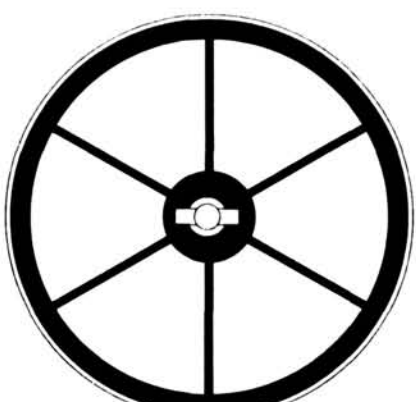
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PANDA CYCLONE

(Continued from page 120)

get through the instructions, they'll be well on their way to R/C fun with the

Panda Cyclone.

*Here is the address of the company featured in this article:
Global Hobby Distributors, 10725 Ellis Ave.,
Fountain Valley, CA 92728. ■

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CALIFORNIA OVAL

(Continued from page 18)

Sportsmanship Trophy Winners

Herb HanssDirect Stock
Rick WintersGearcase Stock
Dave MastinichDirect Open
Ted McDonaldGearcase Open
Bob Baxter1/12-Scale Stock

The people at Advanced Racing Technologies, BoLINK R/C Cars, Dan's R/C Stuff, McAllister Racing, Hot Trick, KO PROPO, Hobby Shack and Global Hobby Distributors gave products and gift certificates to drivers, and just about everyone went home with some good stuff.

McAllister finally met his match at the A-Mains. Steve Pritchett won the Direct-Drive Open A-Main with 54 laps, while Herb Hanss started 2nd and finished there. McAllister finished two laps off the pace in 3rd. Leonard Lee won the Gearcase Open A-main with a 48-lap effort, but the rest of the field was only one lap behind him at the finish. Jon Shigetomi started the Direct-Drive Stock A-main in 3rd and drove away with a close victory. TQ Matt Hirsch finished 2nd, with Joey Sanchez

(Continued on page 128)

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CALIFORNIA OVAL

(Continued from page 122)

ending up in 3rd place. (All three drivers completed 49 laps.) Roger Hofman moved from 4th on the starting grid to 1st at the end of the Gearcase Stock A-main, and TQ Bob Baxter finished one lap behind Hofman with 44 laps, which earned him 2nd place. Wally Ribbs won the 1/12-Scale Stock Class from the pole by completing 59 laps in 6 minutes, and Bob Baxter finished 2nd with Robert Woodside in 3rd place. Baxter and

Woodside both completed 59 laps, as all three cars came past the checkered flag just over 1 second apart.

The sole novice driver, George Batinich, was entered in Direct-Drive Stock Class and made quite a showing, driving a Twister-powered McAllister Outlaw. George qualified 6th in the Stock Class and ended up 7th in the A-Main in his first NORRCA-sanctioned event.

Racing R/C cars is great fun, and it's a real thrill when you put on a show for enthusiastic spectators. It's a satisfying feeling when the fans cheer and call out

your name, and I look forward to the time when I can race in front of a crowd of people yelling for me!

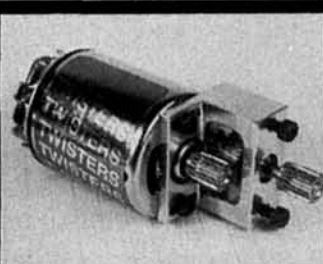
RADIO GLITCHES

(Continued from page 33)

**Correct Glitches After Car Has
Been Built**

Unfortunately, most of us are only superficially aware of the nature of glitching so most of us resort to "fixes," which are

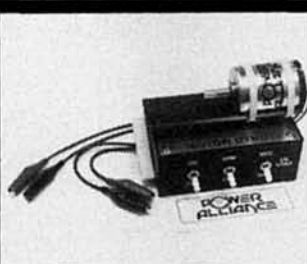
(Continued on page 130)



2 TO 1 TRANNY

Gear Reduction Transmission, Fits Predator, Villan GP10, Shadow 2+2, Viper Outlaw, Infinity-ID, VicFor and Others.

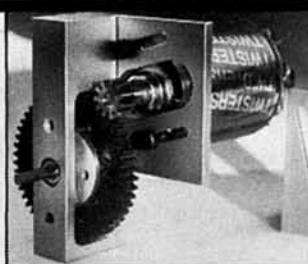
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RADIO GLITCHES

(Continued from page 128)

usually based on hunches or hearsay. (A "fix" is a widely used term in electronics, and it simply means that a solution to a

problem must be found after the car has been built.)

Electronics experts approach solutions to tough problems by identifying the *real* cause. Often, the solution will be to "fix" the problem in a 100-percent absolutely

safe manner. This could mean that one adds components or a function as a "just-in-case" kind of method. There's nothing wrong with this, unless this "overkill" approach costs weight or a lot of money, i.e., solutions to the problems are built-in, even if the cause of the problem hasn't been discovered. Your approach to eliminating glitches must be a 100-percent cure-all.

Next month, in Part 2 of "Eliminating Radio Glitches," I'll tell you 11 specific ways to prevent them. These solutions can be applied to new cars that you'll build in the future and to cars you're now running. Between now and next month, look at your car's electrical components with a critical eye to see if you can spot some of the causes of glitches in your car. ■

ROYAL CRUSHER

(Continued from page 40)

holes are lower on the rear posts. With the shocks in place, the suspension travel is a lot longer than that of most monster trucks, and that should be a big plus on rough terrain.

The Crusher's most notable feature is probably its 4WS system. The idea is

(Continued on page 132)

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 13. 4 body styles

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ROYAL CRUSHER

(Continued from page 130)

simple: If the full-size monster trucks handle tight turning with 4WS, then why not 1/10-scale trucks? The front steering was adjusted with about 2 degrees of toe-in, while the rear was set up with 1 degree. Assembling this system was much easier than I'd anticipated, and it works well if you follow the instructions closely. The most critical part is getting the front and rear axles centered while the

servos are in the neutral position. To do this, you'll have to activate the electrical system while one of the motor leads is disconnected.

Simply plug in the battery pack, turn on the switch and adjust the steering channel on your radio to neutral. Adjust the steering-link lengths by turning the steel Kwik-Links to fit onto the steering control arms while the wheels are centered.

Using a pushrod adjuster with a grub-screw, the speed controller was easily

adjusted to rest in the neutral spot while the servo was also in neutral. Don't forget to apply Switch Lube to the speed controller's circuit-board plate when all the necessary adjustments have been made.

With the electronics in place and the proper tweaking done to the steering, the clear dust cover was fitted to the top of the chassis and the tires were mounted.

The Stars and Stripes seemed like an appropriate paint scheme for an all-

(Continued on page 134)

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ROYAL CRUSHER

(Continued from page 132)

American monster truck hero. The stars were those little Avery Label foil ones used on charts in elementary schools, and

the stripes were 3/4-inch nylon masking tape. The windows were masked out with Track Master* Liquid Mask, and Pactra* spray-on paint was used.

PERFORMANCE: Even after all that trouble with the stiff tranny, the first time

the Crusher was placed on the ground and the trigger punched, it took off smoothly and confidently. The steering seemed to work flawlessly and the truck turned on a dime!

The long suspension throw swallowed up empty aluminum cans and easily crawled over the dolls and other toys my kids had left in the back yard. The family dog snapped out of a sunny afternoon nap with that "Oh no, not again" look on her face and promptly ran for cover!

The Crusher is remarkably responsive and agile for this type of vehicle, and it really puts on a good show. It likes to run wide open, and I can't wait to see what bearings will do for its performance. In fact, it's a great performer and a good investment to consider as soon as the insidious monster-truck invasion reaches the outskirts of your town.

*Here are the addresses of the companies mentioned in this article:

Royal Products Corp., 790 West Tennessee Ave., Denver, CO 80223.

Kimbrough Products, 1430 East St., Andrews Place/Unit F, Santa Ana, CA 92705.

Airtronics, 11 Autry, Irvine, CA 92718.

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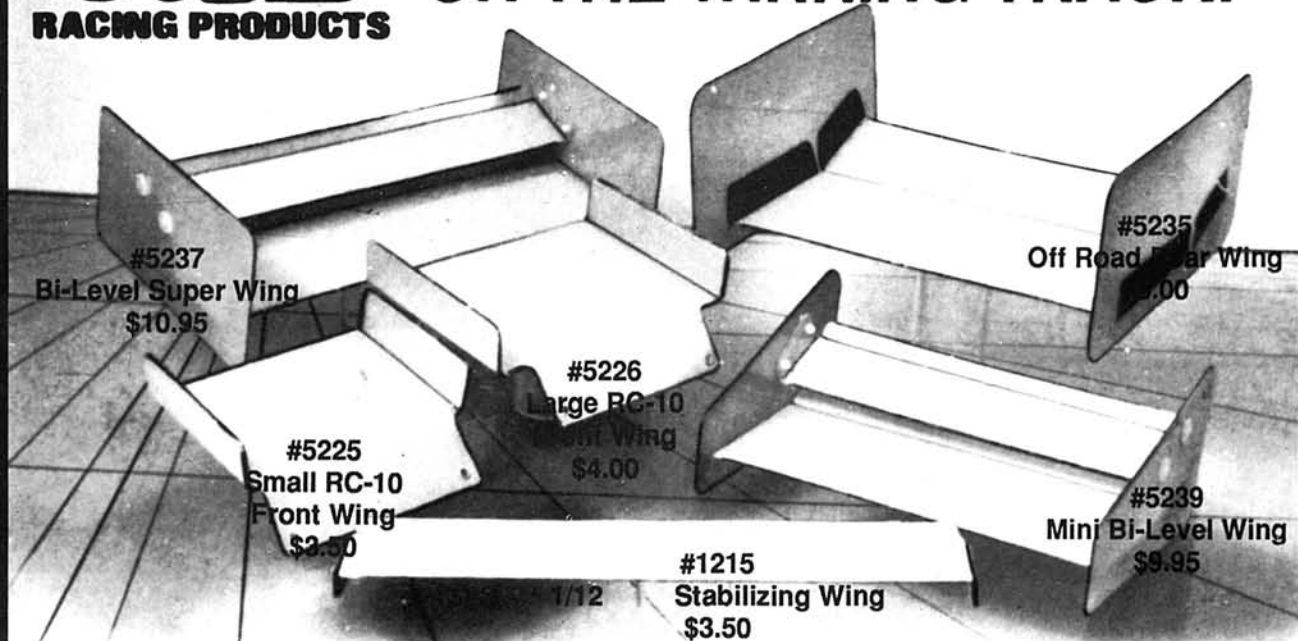
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DIRT DIGEST

(Continued from page 52)

servo is larger or smaller than this, you'll have to work out your own dimensions.) The new linkage will make your steering system more reliable, provide better steering response and maintain easy adjustments.

• High Roller Shorthand: Second, let's take a look at the steering arms on the High Roller monster truck. If you aren't careful to follow the directions *exactly* as

they appear in the manual, you'll cut the lower steering arms to clear the chassis braces. That would be fine if it were necessary, but it *isn't*. The uncut steering arms clear the chassis braces just fine, and the extra leverage provided by the longer arms allows the High Roller to turn on a dime. Given the size and weight of the High Roller, you'll need all the steering leverage you can get.

These are just two examples of improvements made just by examining what you'll be doing *before* you do it. If you know of any other ways to make your

R/C car better *before* you turn on the transmitter for the first time, share them with us. Once you become comfortable with the process of assembling an R/C car, you'll be able to stop and say, "Hey, I can make this better before I ever hit the track"; and the sooner you get to the starting line, the more confidence you'll have during the race.

Next Month

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(Continued on page 150)

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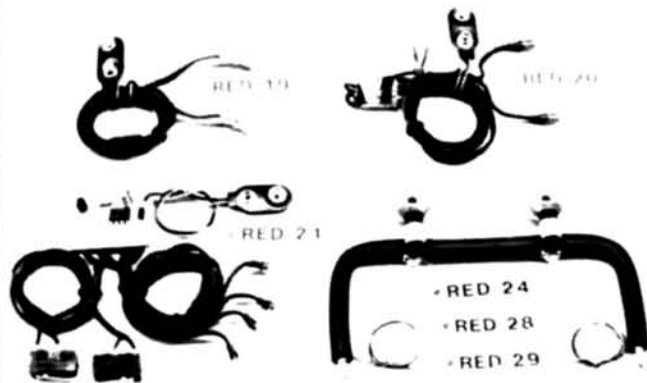
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DIRT DIGEST

(Continued from page 136)

same type of battery and motor? Weight and see! Get the hint? If not, you'll see more about *weight* next month. As Bob mentioned, if you have a trick to make your car run better or have solved the eternal riddle of the 4WD Sphinx, write to us and let everybody know about it. Until then: later for you, kid.

*Here are the addresses of the companies mentioned in this article:

Kyosho; distributed by Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

O.S.; distributed by Great Planes Model Distributors.

Du-Bro Products, 480 Bonner Rd., Wauconda, IL 60084.

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

PRO RADIANT

(Continued from page 68)

like me. I reinforced the servo tape with a single cable tie wrapped around the servo and to the chassis. That should do it, but a more solid, standard, mounting system would be better.

Because the Pro Radiant is now fur-

nished without a speed controller, you have to supply your own. I opted for a Kyosho* Speed 500 electronic speed controller, which is a super-compact unit, even with the heat sink attached. Unfortunately, the Speed 500 isn't quite up to the rigors of 4WD, as you'll see later.

For a motor, I chose the new Land Killer from F&D Racing. Based on the Air Supply motor can and featuring an 18-turn armature, wet magnets, ball bearings and a modular, breathing end bell, the Land Killer is a motor worth considering.

(Continued on page 152)

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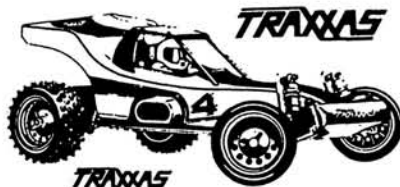


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PRO RADIANT

(Continued from page 150)

Rounding out the Pro Radiant is its all-new body design. Apparently, AYK couldn't resist going the route of aerodynamics and has designed a hot new body that's trim and sleek. Complementing the new body is the new, separate wing,

which, when mounted, makes the Pro Radiant look a little like an Indy car. If you dropped the suspension and added slicks, you'd have a 4WD tranny-class Indy car!

PERFORMANCE: Well, the assembly is finished, and it's time to give the Pro a workout. In my previous Radiant review, I found that punching off the

Radiant on the kitchen floor is a big mistake. I was sentenced to 15 minutes of hard labor cleaning the floor, but having forgotten about that particular crime, I committed the offense again. This time, I not only laid down scads of rubber marks on the floor, but I also took out the ironing board in the process! After a

(Continued on page 154)



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PRO RADIANT

(Continued from page 152)

sentence of 30 minutes of hard labor and \$35 for a new iron, I looked back and was amazed at my inability to react to the Pro Radiant's very fast action. On the road, the Pro Radiant had gobs of punch from its Land Killer motor and speed that rivaled a couple of my road-racing cars. However, because the new pin-spoke tires on the Pro Radiant don't last long on asphalt, I was limited to only a few laps, so I took off to the dirt track.

At the track, I found that the Kyosho Speed 500 speed controller wasn't designed to handle a hot, modified motor in a 4WD dirt killer. Thankfully, the Speed 500 has more brains than I have, and it shut itself off when it overheated, so saving me the cost (and embarrassment) of repairing the controller. In truth, the Speed 500 is designed for road-racing 1/12-scale cars. I finally placed another electronic speed controller in the Pro Radiant and proceeded to wring it out.

In the dirt, I found the Radiant was better than the previous rear-engine version. Handling is much quicker and more precise, and with the front diff just a tad on the loose side, I was able to get the

rear end to do most of the work. Just as the rear end would begin to break loose in a corner, the front would take over and pull the Pro through. All I noticed was a hint of rear tail sway. I like it that way!

Jumping the Pro Radiant was a real gas! The Pro is markedly lighter than the older version, and it shows up here in the jumps, as the car just sails through the air. It seems to nose-down slightly, but a minor front spring adjustment should cure that. The suspension worked superbly, soaking up the jumps with no rebound and leaving the car ready for the next command. The Land Killer motor gave almost too much power for the tight turns of my local track and created plenty of punch out of the corners and lots of speed down the straights.

Overall, I found little to fault with the "driveability" of the Pro Radiant. Mostly, I could cure anything that showed up with a few suspension adjustments. I feel that the Pro Radiant is a serious contender against any 4WD-class car, and it might very well be the car that others will find themselves chasing. It's simple, yet very effective. Sure, the diff is a pain to adjust, and you'll have to buy bearings for the axles, but this is a small price to pay for a real winner. To anyone looking for

a 4WD car, I say, take a close look at the AYK Pro Radiant.

*Here are the addresses of the companies mentioned in this article:

AYK Racing, P.O. Box 3479, Mission Viejo, CA 92690.

Race Prep, 20115 Nordhoff St., Chatsworth, CA 91311.

Kyosho; distributed by Great Planes Model Distributing, P.O. Box 4021, Champaign, IL 61820.

STRIKER FRONT END

(Continued from page 70)

on your new front end. To do this, go back to Screw Bag A and remove four 4x6mm pipes, four 3x15mm screws and, from your C parts, four C2s (plastic nuts). Slip a pipe into the top and bottom mounting holes of the shocks, and put them into their mounting brackets in the A-arms and the shock tower. Screw in the 3x15mm screws and use the plastic nuts to secure them. Neat, eh?

Combine this new front end with the chassis bracing and, not only will your Striker handle better, but you'll be more bulletproof against those other hammers out there. Happy racing!

*Here's the address of the company featured in this article:

Tamiya/MRC, 200 Carter Dr., P.O. Box 267 Edison, NJ 08818.

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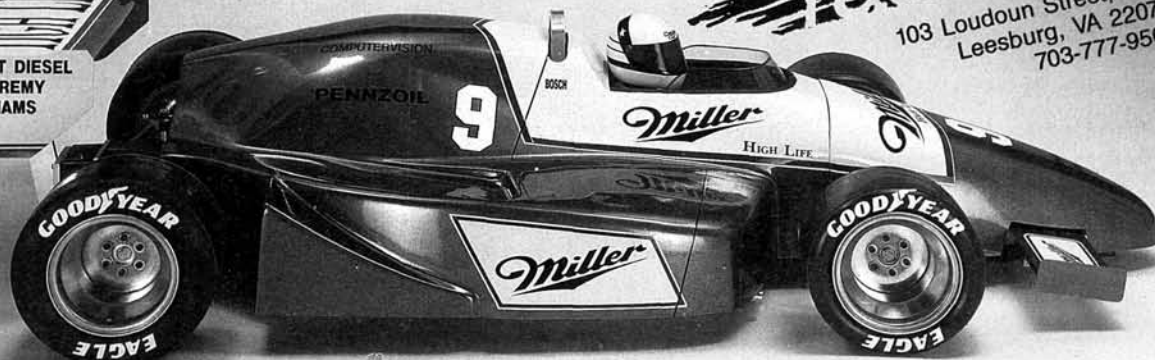
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STADIUM RACING

(Continued from page 78)

Open Monster Truck A-Main

TQ Scott Scherburn took the early lead, but at the halfway point, it was Tem Raskin in the lead with Bobby Drummond and Brandy Dreifus in tow. Raskin's machine came to a complete stop on lap five as Brandy snaked her way into the lead while Drummond held on to 2nd and Tom Owens, 3rd. In spite of Drummond's attempts to regain the lead from Brandy, their positions held to the finish line!

Novice A-Main

Phil Cota took the point position at the start and didn't want to give it up, while Chris Cota, Bob Seager and Jason Meudt were all over each other as they jockeyed for 2nd place. Jackie Gray moved into the runner-up spot for a few laps before falling back, and at the finish line, it was Phil Cota in 1st, Chris Cota in 2nd and Gray in 3rd.

Two-Wheel Stock A-Main

TQ Ron Williams grabbed the holeshot and was determined to hold it, while the runner-up position was savagely fought over by Jon Anderson, John Stephens,

(Continued on page 158)

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STADIUM RACING

(Continued from page 156)

Tony Rossetti and Tom Clark. Anderson left it up to the others for a while, then he took over the lead from Williams and

threatened to win! Anderson and Williams both beat the finish buzzer to go around one more lap, and on the very last turn, Anderson spun out and Williams shot past to victory! Anderson took 2nd and Clark, 3rd.

Super-Stock Truck A-Main

John Keck took the lead early with Mike St. Marie and Keith Heaton right behind! Scott Green moved into the runner-up spot for a while as Keck stretched his lead. Unfortunately, by the time this race was run, most of the crowd had gone inside the stadium to watch the evening races. However, a rather boisterous group of young ladies hung tenaciously on the back fence, loudly cheering-on the last few R/C heats and obviously having loads of fun!

At the finish line, it was Keck in 1st, St. Marie in 2nd and Green in 3rd.

Stock Monster Truck A-Main

Cliff Stroemer jumped out in front at the gun, but lost the lead to TQ David Lord who had Mark Magee snapping at his heels. A broken wheel took Cliff out of the race, and this left three (two other drivers were DNS) trucks to battle for finishing positions. At this point, Fred "Mouth of the South" Gebauer—the event's long-winded announcer—started calling up the trophy winners to get their awards so they could go watch the big races!

At the wire it was Lord in 1st, Jeff Martin in 2nd and Magee in 3rd.

(Continued on page 160)

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STADIUM RACING

(Continued from page 158)

Four-Wheel Stock A-Main

Right away, Dominic Sellers grabbed the holeshot and started to stretch it out, while Jeff Benmoin tried his best to catch him! Benmoin "bobbled" and let Eddie McKay get past; Sellers stuffed it in a turn, and

McKay was past him in a flash! Bobby Drummond took over the runner-up spot and began to reel in the leader. McKay lost it on the moguls, so taking his car and Drummond's out, but Drummond came out on top. McKay tucked in behind the new leader while George Johnson and Justin Albright contested the 3rd position. Frequency demons caused John Keck

to pull out of the race, and TQ Daryl Lane broke a wheel. Sellers moved back up with the leaders in the final moments of the race and, at the wire, it was Drummond in 1st, McKay in 2nd and Sellers in 3rd.

With the final Main completed and all the trophies handed out, these R/C race

(Continued on page 164)

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STADIUM RACING

(Continued from page 160)

addicts packed up their pit gear, locked everything in their cars and were off to the stadium to catch the final Mains of the full-size dirt warriors! Some people just can't seem to get enough, and this should come as no surprise, considering the scale off-road excitement offered by truck-bodied dirt machines.

COX BANDIDO

(Continued from page 87)

hop-up parts for the Kyosho Pegasus/Icarus/Cosmo line of cars will also fit the Bandido.

Combo kits like the Cox Bandido are usually the best choice for a beginner. This kit, like similar ones from other manufacturers, might not contain state-of-the-art components, but they all have in common a reliable, dependable design and easy maintenance. Those on a tight budget will appreciate the side benefit that buying a complete package is often more economical than purchasing each item separately. Compared with the cost of some of the more sophisticated buggies around, you

(Continued on page 167)

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(Continued from page 164)

won't feel as though you've been held up by a bandit when you pay for it. If you're a novice, you'll probably have just as much fun with this car as with some of the more expensive models. Go ahead! Bash it and abuse it, because that's how you'll gain the valuable experience you'll need to move up to more advanced cars. You won't set any track records with it, but whatever you dish out, the Bandido can take it.

**Here's the address of the company featured in this article:*
Cox Hobbies, Inc., 1525 East Warner Ave., Santa Ana, CA 92705. ■

VON ERICH'S GARAGE

(Continued from page 107)

(or “positive” caster) for most cars. On cars such as the TRC and McAllister* racers, you can loosen the adjusting bolt and rotate the entire axle to get the desired amount of caster. Very *little* is required! Cars like the Lazer Lite* Shadow, the C&M* Cobra, and others using the Associated*-style front ends have angled spacers that go under the front-end blocks—usually in 2-degree increments.

Some cars have adjustable springs on their rear dampening systems. On a smooth track, you won't need much spring action and can try tightening the springs or replacing them with heavier parts. This might help the car go faster through the turns and hook up better entering the straights. By now, your car should be just about as good as the rest of the cars, and all it will take to get into the winners' circle is brushing-up on your driving skills. If you're still getting blown off at the ends of the straightaways, you might consider going up a tooth or two on the pinion just to see what happens. (I'm assuming you've been taking care of your motor and cleaning it after every race, and that you have a decent set of batteries.)

Now that you have your car running faster, some new problems might develop as the speed increases. That little “push” you so carefully set up is now letting your car go straight into the wall at each corner, or perhaps the car hooks badly halfway through the turn. Just remember how you got it to run better, and keep making the proper adjustments—a little at a time—and you’ll soon get it all figured out. Fine-tuning is an art, and the most important thing to remember is to make *only one* change at a time, and to do it so you can put

(Continued on page 168)

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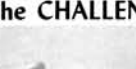
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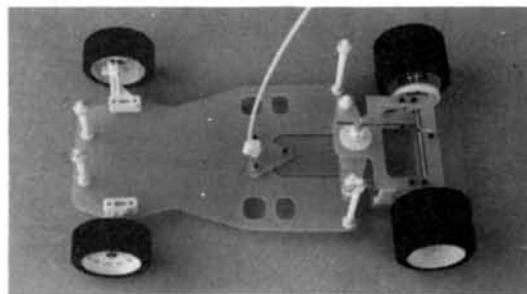
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VON ERICH'S GARAGE

(Continued from page 167)

it back the way it was before. Try working with these set-up procedures, and you'll soon be wise to the art of race-car preparation. It's also a pretty good bet that we'll see you in the A-Main!

*Here are the addresses of the manufacturers mentioned in this article:

TRC, P.O. Box 1058, 2211 Charter St., Albemarle, NC 28001.

BoLINK R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

Paragon Racing Products, 8802 Knollwood Dr., Eden Prairie, MN 55344.

Trinity Products, Inc., 1901 E. Linden Ave., #20, Linden, NJ 07036.

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Lazer Lite Systems, 2090 SW 71 Ter., Unit H8, Davie, FL 33317.

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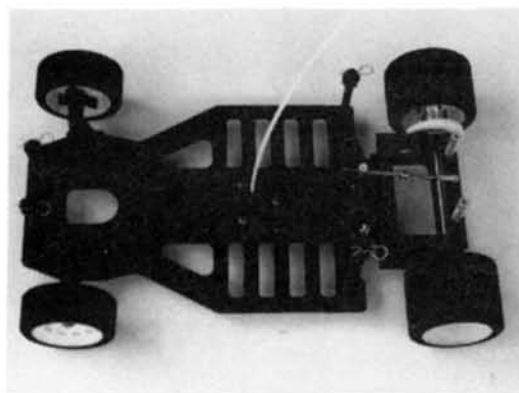
NUMBERS GAME

(Continued from page 111)

Another number design is the shadowed number. This design looks as though the number actually stands out from the side of the car, so causing a shadow to fall on the car body just to one side and slightly below the number. To create this style, stick your basic number onto the contrasting Mylar film as mentioned before, but cut flush along the top and right side of the basic number. On the bottom and left side, cut away from the basic number, leaving a border to simulate a shadow.

Be creative! The possibilities are endless. By using another color or chrome Mylar, you can make a three-toned number. You can combine shadow and outline to create original effects. Use several colors in combination or use different shades of the same color. Even if you use off-the-shelf numbers, multi-digit numbers can be hard to keep aligned when putting them on the body. To do this, use a sheet of silicone release paper. (This is the same stuff that's used for the backing of Mylar film.) Peel the numbers from the original backing paper and position them on the release paper. You should be able to move them around a little until they're aligned. Now take a strip of masking tape and stick it to the numbers. This will allow you to lift the numbers off the release paper in perfect alignment. Position the masking tape on the body and rub the edges of the numbers with the handle of a screwdriver (or some other smooth, hard

(Continued on page 174)



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NUMBERS GAME

(Continued from page 168)

object), right through the masking tape. This will ensure that the numbers adhere to the body. Finally, peel the masking tape from the body very carefully, leaving the numbers in place.

You're now an expert in the fine art of number detailing! Be brave and give it a try. Who knows? Your car might be the next Concours winner. See you at the track! ■

LUNCH BOX

(Continued from page 99)

Lunch Box to rest for the photo shoot.

After recruiting madman Fred Murphy to pilot the Lunch Box, we headed for a

desolate swimming hole with a sandy border where we could get some shots of the Box in action. As soon as Fred could get the tires on the sand, he buried the throttle with reckless abandon. Once again, the Lunch Box "dug in its heels" and powered into a wheelie. When the front end settled back to earth, Fred flipped the trigger to the brake side and the Box whipped its tail around. Before it had a chance to get all four wheels on the ground, Fred leaned into the throttle again. The Box hesitated as it looked for some solid ground to get hold of, then it began to charge back at us with its nose high in the air. It was more than obvious that the size of the Lunch Box gives it an unfair performance advantage over the rest of the monster-truck field. It's certainly faster than any other monster because of its weight, and it's very stable. However, the

Lunch Box isn't a contender for the Off-Road World Championship, and it was never meant to be. It's just a hell of a lot of fun.

*Here's the address of the manufacturer mentioned in this article:

MRC/Tamiya, 200 Carter Ave., P.O. Box 267, Edison, NY 08818. ■

SCOPING OUT

(Continued from page 114)

When everything is fully checked out and working, it's time to reinforce the electronic components against crash damage. The two resistors, the three capacitors and the voltage-regulator chip should be glued into place with 5-minute epoxy. (Devcon 5-Minute Epoxy (DEV2000); \$2.55 from Tower Hobbies*). This is especially important for the 1000uf capacitor and the LM317 voltage regulator because of the large size.

Finally, bolt the entire assembly to the chassis, install the speed controller and hook-up the motor (see Figure 4). My speed controller has four heavy wires for handling the motor current, and they're hooked-up like this: Both red leads go to the "fuse out" pad; the black lead goes to the "negative battery lead" pad (soldering point), and the blue lead goes to the "motor control" pad. The positive lead of the motor goes to the "fuse out" copper pad, and the negative lead of the motor goes to the "motor control" pad.

Don't forget to remove the center red lead from the receiver connector on the speed controller. On the Futaba J-series connector, it's possible to extract the pin by lifting the plastic locking tab that locks the pin in place. (Some connector types might require that you cut this lead.) I then folded back this wire with its pin attached and covered it with tape.

If all has gone well, you should now have an excellent speed-controller setup. This setup places the speed controller close to the motor and battery, and this keeps all the high-current wiring short. (It also eliminates all but one of the connectors.) The BEC circuit has capacitors that are large enough to suppress glitching.

This project requires that you have the ability to make a good solder joint and some basic modeling skills to etch and cut out the PCB. All the parts in this project (with the exception of the resistors) came from Radio Shack. The resistors are 2-percent 1/4 watt and can be obtained from your local electronics supply store. If you think all this is beyond your capabilities, contact me for more information. My

(Continued on page 176)

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SCOPING OUT

(Continued from page 174)

address is at the end of the article. Happy racing, and good luck!

*Here are the addresses that are pertinent to this article:

Futaba Industries, 555 W. Victoria St., Compton, CA 90220.

Kyosho; distributed by Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

Tekin, 970 Negocio, San Clemente, CA 92672.

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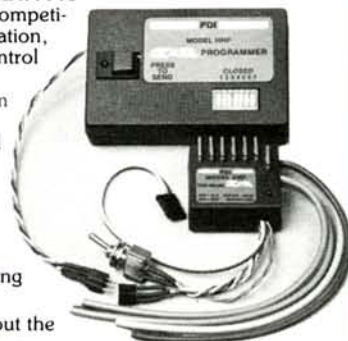
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In keeping with our constant efforts to help foster the growth of the radio-control car hobby, we've decided to run this track directory intermittently to inform modelers where they can race and exchange ideas. If you'd like your track listed, send us your name, address, phone number and some information about the track to R/C Car Action Track Directory, 251 Danbury Road, Wilton, CT 06897. We'll list as many clubs as space allows.

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